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MYSORE, INDUSTRIAL AND COMMERCIAL

BEING

A PRELIMINARY SKETCH

OF

THE RESOURCES, INDUSTRIES, TRADE AND COMMERCE

OF

The Mysore State

00109034

IN THREE PARTS

BY

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109034

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PREFACE.

As pointed out by Mr. A. C. Chatterjee, in a paper read before the Indian Industrial Conference, the scope and method of an Industrial Survey* are variously understood. A descriptive or critical study of the indigenous or hand industries, or of art industries only will not be complete. Description of the technical processes in all industries is beyond the capacity of any one individual and it is not of much use, besides.

A study of the local resources in raw materials and power, in labour, capital and other facilities and of Trade and Commerce, should claim prominent attention.

For, a detailed study of production of raw materials and of trade returns furnishes a reliable means of ascertaining and estimating local wants and consumption, while a further study of the industries utilising those materials and of the trade in the raw materials and in manufactured products, would be helpful in deciding the nature and extent of the new industries possible or in developing those already in existence, if need be.

The Report is accordingly drawn up on these lines and the following procedure has been adopted in its preparation, since the end of July 1912, when the writer assumed charge of this special duty.

A memo was prepared formulating the main lines on which the report was to be drawn up and these were approved.

The several important publications relating to Mysore were then studied and the detailed lines of enquiry decided upon. A provincial tour was next undertaken and about seventy of the more important industrial and commercial centres visited and full notes taken, after sifting the information at meetings of the workmen, merchants, traders and the more intelligent local public, at each centre of enquiry.

Further interrogations were circulated and, pending the receipt of replies, drafts of chapters were prepared, the same being revised in the light of additional information received.

The preparation and printing of matter covering over three hundred and odd pages, foolscap size, including sixteen maps and graphs, and over one hundred elaborate tabular statements, necessarily took up much time and, consequently, the report was divided and printed in parts and these submitted to Government from time to time, as they were ready, since November 1913.

Part I is devoted mainly to a study of the resources in materials and in power and of the economic condition of the more important sections of the population. An enquiry has been started to ascertain the production and consumption of some

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* "We are thus confronted with the question, what should be the aim of an industrial survey? To my mind its ultimate object ought to be to indicate the economic possibilities of the Province. Briefly, we should study the resources of the Province in soil and raw products, labour both skilled and unskilled, capital, communications and facilities for trade. We have then to ascertain the wants of the people in the shape of finished articles, or, in economic language, the demand that exists among consumers. The surveyor has then to endeavour to find out whether the demand is or can be locally met, and also to suggest what would be the best method of utilising the surplus raw products of the Province." *Report of the Third Indian Industrial Conference, 1907.*

of the necessities of life, such as articles of food, clothing and others. This part concludes with a summary of all the main suggestions offered, together with a programme of further continuation work.

Forest and mineral maps of Mysore, kindly furnished by the Conservator of Forests and the State Geologist respectively, are reduced to convenient sizes and embodied.

Graphs are appended showing the variations in the average annual prices of four chief food grains and of salt, for 26 years, on the basis of the figures published by Government in 1906 giving the prices for 45 years and of those issued subsequently from time to time.

Variations in the areas under six important crops from 1895-96 to 1909-10 are also shown in the form of graphs. There are six plates, one for each crop, each plate containing eight graphs, all for the same crop and one for each district.

Part II gives a descriptive account of the various industries in the State, the opening chapter thereof furnishing a generalised account of some of them.

Part III is devoted to a discussion of the sources of Trade and other Statistics, and to a detailed review of the Trade and Commerce of the Mysore State and has appended to it tables and statements relating to trade by rail, external and internal and to that by road, external.

A small amount of information about the nature and extent of traffic by road across the frontiers was collected at Agumbe, Marnahalli and Bisle and the same is embodied in the form of statements and remarks.

N.B.—The absence of means of checking the present sources of statistics of railborne trade is very much to be regretted. This want could, however, be supplied if sanction be accorded to the scheme suggested in the last two paragraphs of page 2, Part III, of this report, whereby the figures that could be compiled from the railway stations in the State might be used to check those obtained at present.

It will be thus seen that a very wide ground had to be traversed, with an attempt at some detailed consideration in the case of a few of the subjects dealt with.

A detailed study of every one of them would be necessary before industrial propositions become possible and, as already mentioned, a line of future work has been suggested in Chapter VII, Part I.

Moreover, the bulk of the matter dealt with in this report refers solely to Mysore and a comparative study yet remains to be undertaken by visiting the various important industrial and commercial centres, firstly in India and secondly in parts of foreign countries, where the conditions and resources are somewhat similar to those in Mysore.

The subject of Technical Education was fully considered by a special Committee and a report published and consequently it has not been dealt with in this report.

It may be remarked, in passing, that some of the writers of similar reports relating to British Provinces in India had certain advantages in their favour, in the form of supply of special notes, on the various special subjects from experts and on several general points from local officers.

Before concluding these prefatory remarks, I take this opportunity of publicly expressing my thanks to the several Heads of Departments, Deputy Commissioners, Executive Engineers, Forest Officers, Amildars and other officers of Government who so readily responded to my requisitions for information, and specially to Mr. Chatterton for his guidance and advice in the initial stages ; to Dr, Smeeth,

for the Geological and Mineral Map of Mysore, specially prepared for this report; and to Rai Bahadur M. Muthannah, for some notes on Forest resources.

I have also to thank the Managers of the various industrial establishments for their ready compliance with my requisitions. Messrs. Graham Anderson and Kalappa, two of the pioneer coffee planters in Mysore and several others gave me much valuable information about the coffee industry and about the depopulation of the *malnad* and I thank them for the same.

The following is a list of the more prominent books and publications consulted :—

Administration Reports of the Government of His Highness the Maharaja of Mysore and the several Departmental Reports; The latest Mysore Census Report; Rice's Gazetteer of Mysore; Imperial Gazetteer of Mysore and Coorg; Agricultural Statistics of Mysore; External Rail-borne Trade of Mysore published in 1901 and in 1913; Revenue Statistics of the M. S. M. Company; Commercial Products of India by Sir G. Watt; The various Industrial Survey Reports of parts of British India; Forest Utilisation by Troupe; Pearson's Forest Economic Products of India; Essential Oils and Perfumes by Piesse; Perfumes and Their Preparation by Askinson; Mineral Industry of the World, Its Trechnology and Trade; Ball's Natural Sources of Power; Reports of the Indian Industrial Conferences, including that held at Ootacamund; Thorpe's Dictionary of Applied Chemistry; Spon's Dictionary of Receipts and American Cyclopædia of Receipts; Conference Bulletins and several others.

MYSORE, INDUSTRIAL AND COMMERCIAL

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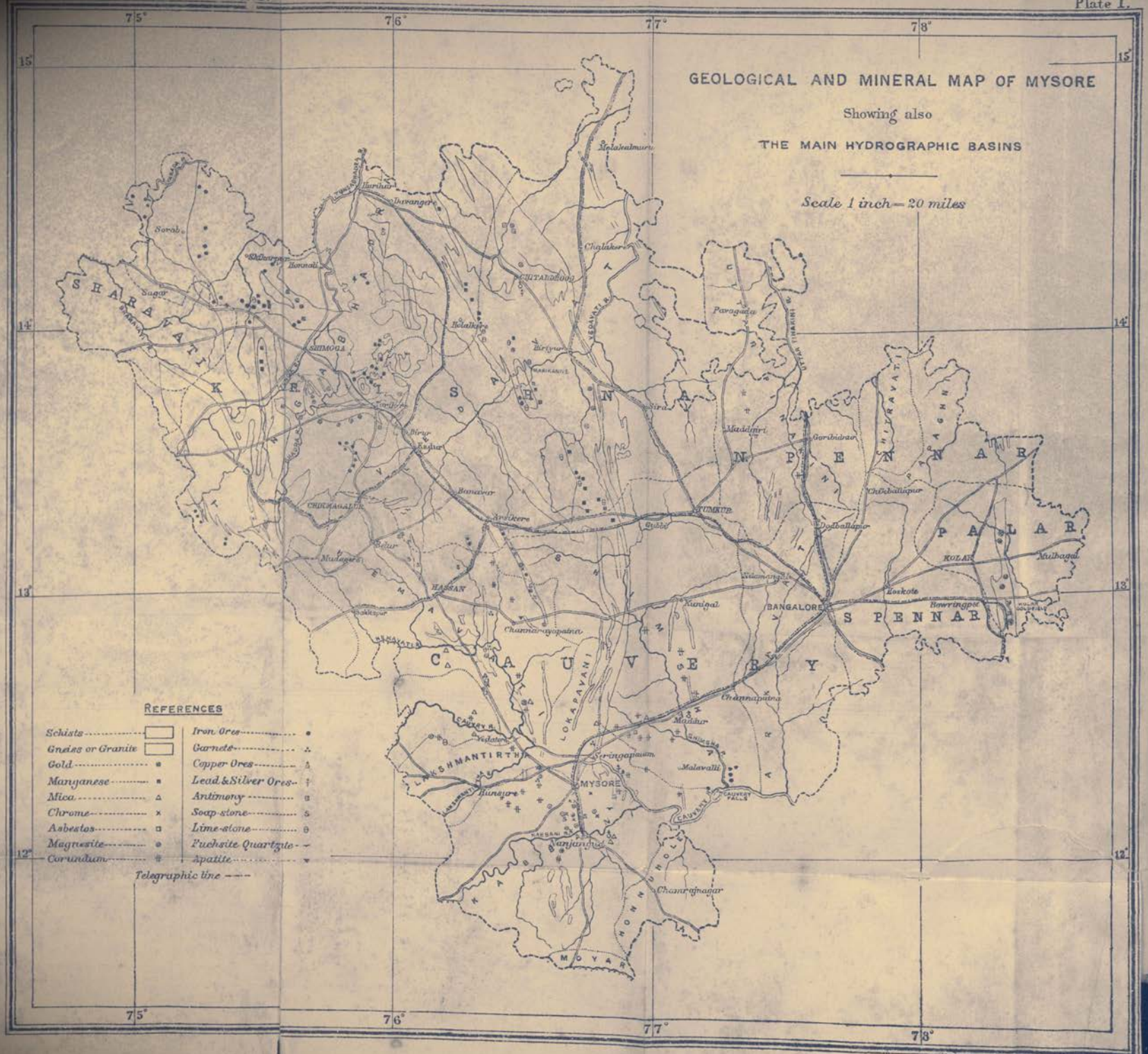
16. Do oil seeds, other than *Til* or *Jingilee* do

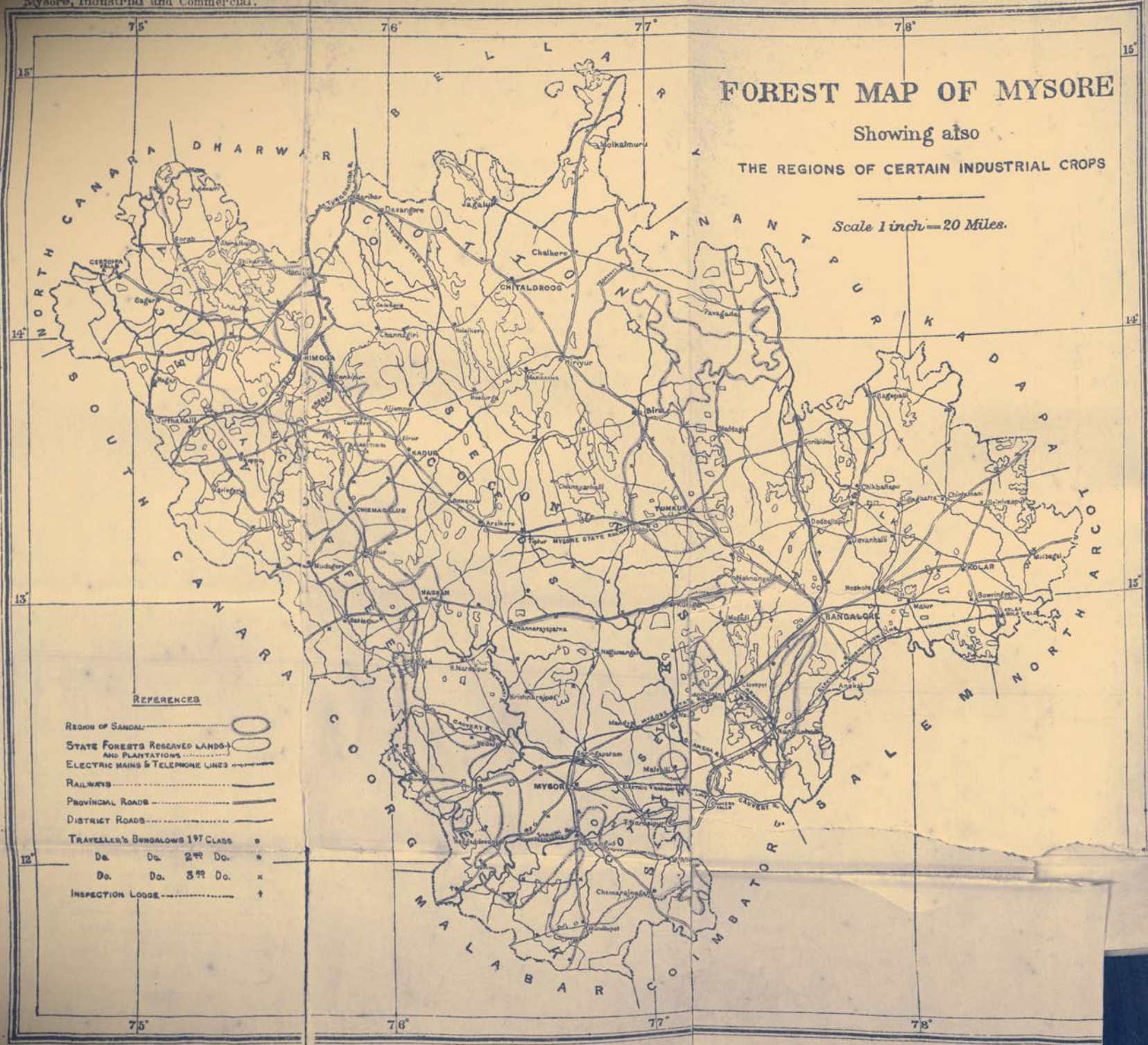
GEOLOGICAL AND MINERAL MAP OF MYSORE

Showing also

THE MAIN HYDROGRAPHIC BASINS

Scale 1 inch = 20 miles




FOREST MAP OF MYSORE
Showing also
THE REGIONS OF CERTAIN INDUSTRIAL CROPS
Scale 1 inch = 20 Miles.
REFERENCES
REGION OF SANDAL
STATE FORESTS RESERVED LANDS AND PLANTATIONS
ELECTRIC MAINS & TELEPHONE LINES
RAILWAYS
PROVINCIAL ROADS
DISTRICT ROADS
TRAVELLER'S BUNGALOWS 1ST CLASS
Do. Do. 2ND Do.
Do. Do. 3RD Do.
INSPECTION LODGE
NORTH CANARA
DHARWAR
BELLARY
ANANTPUR
KADAPA
NORTH ARCOT
SALEM
COIMBATORE
MALABAR
COORG
SOUTH CANARA
COTTON
SECONDS
SILK
COFFEE
CHITALDROOG
SHIMOGA
KADUR
CHIKMAGALUR
TUMKUR
BANGALORE
KOLAR
MYSORE
Molkalmuru
Davangere
Jagalur
Chalkere
Hiriyur
Sira
Tiptur
Arsikere
Chikmagalur
Mudigere
Hassan
Kannarayapatna
Krishnarajpet
Mandya
Malvalli
Chamarajnagar
Hundlupet
Kunigal
Nelmangala
Dodballapur
Devanhalli
Chikballapur
Goribidnur
Bagepalli
Malur
Bowringpet
Anekal
Kanganhalli
Sagar
Sirthahalli
Tarikere
Aljampur
Bankipur
Channagiri
Holalkere
Pavagada
Chiknayanhalli
Sidlaghatta
Chintamani
Srinivaspur
Mulbagal
Hoskote
Nagamangala
Krishnarajpet
Yedatore
Sarigapatam
Kanjangud
Nanjangud
Hunsur
Kaveri
Cauvery R.
Cauvery Falls
Mysore State Railway
Mysore State Railway
Mysore State Railway
Electric Transmission Line
Electric Transmission Line
75°
76°
77°
78°
15°
14°
13°
12°

CORRIGENDA AND ADDENDA.

PART I.

For					*Read.*
After 1,74,321 in line 4, page 4, add " between Mysore and the British Provinces in India "					
Year	in line 10 page 4				Census.
8,600	,,	32	,,	4	8,700.
Before " 1911 " and " 1901 " in line 35, page 4, add " the [illegible] "					
After " of India " in line 37, page 4, add " and outside "					
pharamacy	,,	6	,,	11	pharmacy.
prevalant	,,	25	,,	11	prevalent
Rs. 2	,,	12	,,	27	from Re 1 to Rs
refactory	in last line		,,	64	refractory.
for	,,		,,	69	of
Benkipur	in line 37		,,	71	Bikasipur
Leucopheasa	,,	7	,,	72	Leucopholia.
XYlia delabriformis	,,	8	,,	72	Xylia dolabriformis.
not	,,	32	,,	76	no
After " agency " in line 33, page 76, add " till recently "					
Civil	,,	32	,,	77	civic
different	,,	11	,,	86	the two
25 years in Plates VIII, XI and XII 26 years					
After " exports " and " imports " in columns 6 and 7, Table II, page 7[illegible] [illegible]					

PART II.

For	*Read*
robbin in line 15, page 64, ribbon	

PART III

For	*Read*
53·21 in last line in column 3, page 16, 48·70	
After the first paragraph in page 23, insert a sub head " [illegible] "	

INTRODUCTORY.

Geographical.

Mysore, one of the three premier Native States in the Indian Empire, lies between 11°·36′ and 15°·2′ north latitude and 74°·38′ and 78°·36′ east longitude.

It is roughly triangular in form with the Nilgiris for an apex on the south. Portions of the two Ghats—Western and Eastern—bound the State on the west and parts of the east respectively and separate it from the lower levels of the Bombay and the Madras Presidencies; while the northern boundary is made up partly by a line of hills of the Dharwar Collectorate and partly by the river Thunga Bhadra. The State is enclosed on all sides by parts of the Madras and Bombay Presidencies and has no sea-coast.

The nearest distance to the sea is on the west and is about 8 miles, while the average distance to the west coast varies from 30 to 50 miles. It may be noted that this inland position of the Mysore State is a serious disadvantage from the point of view of trade and industry.

The greatest breadth from east to west is 290 miles, greatest length, north to south 230 miles and the area 29,474 square miles according to the latest survey and including the Civil and Military Station, Bangalore.

There are two main hill systems which run roughly parallel to the general trend of those of the two Ghats. The western tracts of the State are very hilly and are covered with extensive areas of forests, while the eastern portions are less so and are more or less free from forest growth. This feature of hill and forest divides the Province into three main tracts, the *malnad* or the region of hills, the *maidan* or plain country, with an intervening belt styled the *semi-malnad*, partaking of the nature of both.

The Mysore State forms part of a plateau sloping down from west to east except in portions in the north-western corner where the slope is in the reverse direction. There is a long 'T' shaped ridge or water shed, the body line of the 'T' running almost east and west and across the whole State with the line of the 'T' head on the east ranged north and south. It divides the State into two main hydrographical basins, the Kaveri to the south, the Thungabhadra to the north, with three minor basins, the Palar and the two Pennars to the east, of approximate areas of their basins of about 10,988, 11,388, 1,060, 1,363 and 2,566 square miles respectively, excluding those of their tributaries. The general elevation of the plateau is about 2,000 feet above the sea level on the north and south and about 3,000 feet at the central water parting, with some of the peaks and *droogs* raising their heads up to about 3,000 feet above the general level of the table land. Quite unlike many plateaus, the general surface of the country is uneven and even rocky and is intersected by long narrow valleys.

The State is composed of 8 Administrative Divisions or Districts, 3 of which, *viz.*, Shimoga, Kadur and Hassan constitute the Western Division—the *malnad* and the *semi-malnad*, while the remaining 5 *viz.*, Chitaldrug, Tumkur, Kolar, Bangalore and Mysore, form the Eastern Division and constitute the *maidan* area of the State. The Mysore district has the largest area (5,488 square miles) and Hassan the least (2,665 square miles).

Climate and Rainfall.

Only 3 seasons are recognised in practice in the Mysore State, *viz.*, the rainy, the cold and the hot. About 6 months of the year are rainy from June to the middle of November, 3 months cold and the remaining quarter to May, hot. The rainy season is made up of both the south-west and north-east monsoons and different areas of the State are differently affected by them.

A reference to page 7 of the Report on Rainfall Registration for Mysore for the year 1909 shows 36·94 inches as the average fall for the Province for the last 40 years 1870 to 1909; Kadur, Shimoga and Hassan topping the list with 73·05, 66·68, 38·21 inches respectively, while Chitaldrug occupies the last place with 21·16 inches. Of the other districts, Bangalore has had an average of 30·72 inches, Kolar 27·95, Mysore 27·78 and Tumkur 26·08.

Geological.

Two main rock systems traverse the Mysore State namely, the Archaean gneisses and granites and metamorphic crystalline schists. Besides these two, there are three other rock formations of minor importance, of varying composition, texture and structure. The two main rock systems are associated with different scenic aspects and growth of vegetation.

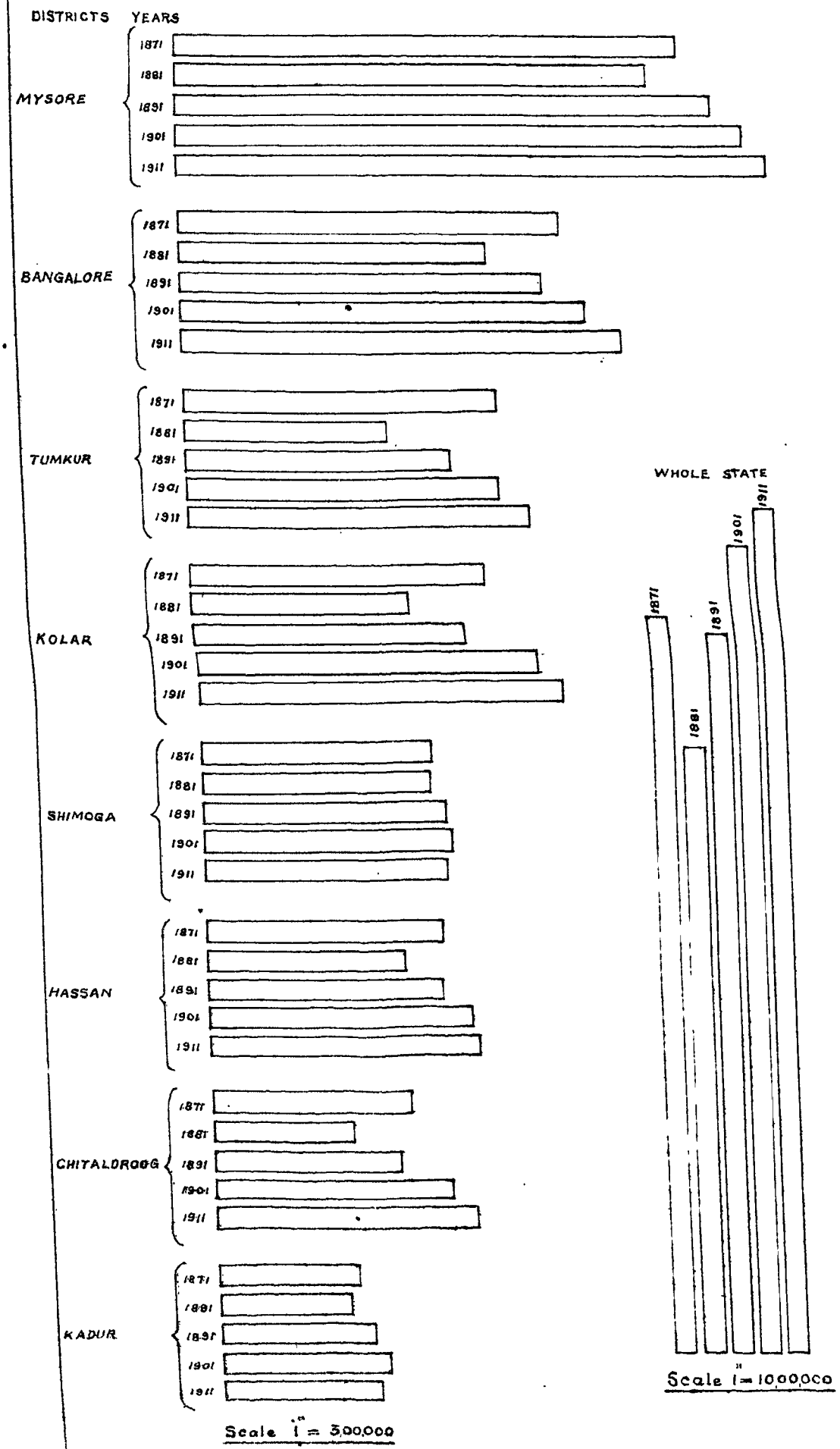
The wide diversity in mineral composition, texture and structure of the rocks of these main systems has resulted in various types of soils being derived therefrom, and of various grades of fertility. The soils derived from the weathering of granites and gneisses are, as a rule, more sandy and less clayey, ferruginous or calcareous than those derived from the dominant types of schists in the State. What are termed pegmatites in the group of granites constitute efficient channels of circulation of underground water.

As sources of mineral wealth, the metamorphic schists have been of enormous value to Mysore, inasmuch as the best paying gold fields in India are situated therein. The important deposits of ores of manganese and chromium are also confined to the rocks of these systems. The potentialities of granites and gneisses, as bearers of valuable mineral deposits, are being investigated by the Geological Department.

A reference to Plate No. 1, shows that the granites and gneisses occupy more than 75 per cent of the area of the State and that main masses of the crystalline schists occur either in the form of patches in the north-western corner of the State or as long continuous band, of varying widths traversing almost north and south, right through the middle of the Province.

The schist area to the north-west is made up of four main patches separated from each other by areas of granite and gneiss. Shimoga is in the centre of one such granite area, Thirthahalli in another and Honnali in the third. The north-eastern third of Chikmagalur and a small strip on the Western Ghats of the Kadur district constitute the schist areas in that district. Major portion of the Shikarpur, Sorab and Chennagiri taluks lies in schists. The other main run of schists is in the form of a long narrow band, which has for its western boundary a line joining Chiknayakanhalli with points east of Huliyar, Hosdurga and Holalkere while its eastern boundary runs a little to the east of Jagalur, Hiriyur and Bukkapatna. The third band of schists is comparatively small and runs to the east of Kolar town and Bowringpet, and is the home of the gold of the Kolar Gold Fields.

A COMPARATIVE VIEW OF THE POPULATION OF THE LAST FORTY YEARS (1871—1911.)



Population of C & M Station is included

Forests.

The twenty two lakhs of acres of forests in the State constitute a very valuable asset, capable of extensive and varied economic developments.

A reference to the forest map of Mysore (Plate No. II) shows that the forests of the State occur mainly in three districts and are of different areas. The most important one is a long narrow strip of country of varying widths all along the western boundary of the State and along part of the southern. Its width varies from about 22 to nearly 60 miles. The heavy downfall of rain of the south-west monsoon has had a very favourable effect on forest growth all along the Ghats. The two smaller areas are confined to the hill ranges of the Tumkur and Chitaldrug districts as well as to those of Bangalore and Kolar.

The ghat forests are divided into the ever green, the mixed and the deciduous belts. The first two constitute the coffee area, the first more than the second and, outside the limits of these, is the zone of the sandal.

In addition to these there are various plantations owned by Government or by private agencies. There are a number of fuel plantations in the Kolar, Bangalore and Tumkur districts.

During the period 1900-01 to 1910-11 the area under forests increased by 50 per cent, from 13,61,746 to 21,95,025 acres, and this increase of about eight and one-third lakhs of acres of forest has been made up by absorbing 7 and odd lakhs of acres from the area "not available for cultivation" and one lakh and odd from "culturable waste,"; that is, the expansion of the forest has reduced the area under cultivable waste by about a lakh of acres. Seven out of the eight lakhs of acres of increase is effected in the Shimoga, Kadur and Chitaldrug districts, about three lakhs in the first, two and half in the second, and one and half in the third. The cultivable waste had suffered the greatest reduction in the Chitaldrug district, from about 3·77 lakhs to 1·9 lakhs of acres.

Population.

The total population of the State excluding the Civil and Military Station is, according to the Census of 1911, 5,705,359 to which the Eastern Division contributes 4,269,986 or nearly 80 per cent and the Western 1,435, 373 or the remaining 20 per cent.

The rural population of the State is 5,147 864 or 90 per cent of the total population, the Eastern Division contributing 3,810,749.

Comparing the 5 Censuses from 1871 to 1911, it is found that the Mysore State, excluding the Civil and Military Station, shows an increase of 14·72 per cent in 1911 with 17·31 for the Eastern Division and only 7·6 for the Western. Between 1871 and 1881 there was a general decrease of population throughout the State by 17·71 per cent, due probably to the great famine of 1877, of which the Eastern Division showed a decrease of 21·26 per cent and the Western only 8 per cent. Tumkur district seems to have suffered the most by losing 34·3 per cent of its population, next Chitaldrug by 28·75, Kolar by 25·6 and Bangalore by 25·14.

The proportion of urban to the whole population is very small, being only 9·7 without, and 11·3 with, the Civil and Military Station. In Baroda, the urban population is 19·9 per cent, in Madras 11·7 per cent and in Bombay 18·1 per cent.

73·14 per cent of the people are engaged in production, transport and distribution of raw materials, 7·6 per cent in industrial pursuits, made up of 1·8 in dressing and toileting, 1·7 per cent in weaving, 0·4 per cent in working up of mills and ·4 per cent in other industries and 3·3 per cent in miscellaneous. Trade finds occupation for 4·1 per cent of the population.

Migration.

A study of the Census figures reveals the great necessity there is for Mysore for a larger population being required to develop the country. For the last two decades immigration has been in excess of emigration and this excess increased from 1,66,852, to 1,74,321.

The main source of supply is furnished by the Madras and Bombay Presidencies encircling the State. The Western Division, *i.e.*, the *malnad*, has been drawing its immigrants from the two Canaras and Malabar. Most of these are periodic immigrants into the State and are composed mainly of the labouring classes. The coffee estates, the areca gardens and the paddy cultivation of the *malnad* need their services, besides a few engaged in distilling cinnamon oil from the leaves of the Indian cinnamon occurring abundantly in the *malnad* and in some retail trades in grains, areca, fish, salt and others.

The districts of North Arcot, Bellary, Ananthpur and Cuddapa contribute their share to swell up the population of the Eastern Division. Most of these are absorbed in the labour force of the Kolar Gold Fields, in the mills in Bangalore and in the building industries in Bangalore and Mysore. The Mysore district gets its comparatively small supply of out side people through Chamrajnagar and other passes from the Coimbatore district. During 1901 Madras supplied Mysore with about 2½ lakhs of people, while during the last year there was an excess of about 8,500 people in round number over that of 1901.

The Bombay people seem to have lost their fascination to Mysore inasmuch as there has been a decrease of about 7,000 people in the emigrants into Mysore from the Dharwar and North-Canara Collectorates. Nearly 36,000 people came into Mysore in 1901 and the number fell to 29,000 in 1911.

As regards emigration from Mysore there has been a slight increase in the number of people going from Mysore to Madras by 3,000 persons or from about 89,000 in 1901 to 92,000 in 1911. A similar excess of 800 is noticed in the number of emigrants into the Bombay Presidency from about 13,000 in 1901 to 13,800 in 1911. Ceylon has been able to attract a very large number of people, the number swelling up to 8,200 in 1911 as against 638 about 10 or 12 years ago. Coorg is continuing to attract people from Mysore. 24,700 persons emigrated in 1901 and 16,000 in 1911. That is, there has been a fall of about 8,600 in the number during the decade 1901 to 1911. On the other hand Mysore is offering increasing attraction to people emigrating from Coorg. Five hundred more people came into Mysore in 1911 than in 1901. With these two exceptions of Coorg and Ceylon, Mysore has been getting an increase of immigration over emigration and has attracted about 68,916 from all parts of India.

Depopulation of the Malnad.

The latest Census returns show that during the period 1901-1911, there has been a decrease in the population of the Shimoga district by about 15,020 people and of Kadur by 20,813. These are the only two districts that have suffered such a large reduction in population, while the others show varied rates of increase.

TABLE I (*a*).

Shows the population in the *malnad* taluks of the Hassan, Kadur and Shimoga districts, for the years 1901 and 1911, and the areas under certain important crops for those years.

Serial No.	Name of Taluk	Population			Difference (in percentage)		Area under paddy			Area under sugarcane			Area under coffee			Area under orchards and garden produce		
		1911	1901	Difference	1901-1911	1891-1901	1910-1911	1900-1901	Difference	1910-1911	1900-1901	Difference	1910-1911	1900-1901	Difference	1910-1911	1900-1901	Difference
1	Belur	73,638	79,192	−5,554	− 7·01	+ 9·24	23,449	31,059	−7,610	893	696	+197	8,250	10,743	− 2,493	524	112	+ 412
2	Manjarabad	50,589	59,304	−8,715	−14·70	+ 6·16	31,056	31,467	− 411	1	2	− 1	16,423	30,962	− 14,539	801	781	+ 20
3	Arkalgud	81,663	76,775	+4,888	+ 6·37	+ 1·27	8,194	8,918	− 724	7	36	− 29	65	147	− 82	2,819	2,220	+ 599
4	Chikmagalur ...	82,044	90,681	−8,637	− 9·52	+ 6·64	27,685	24,100	+3,585	230	312	− 82	31,956	36,000	− 4,044	619	519	+ 100
5	Kadur	81,013	77,422	+3,591	+ 4·64	+12·04	4,420	6,985	−2,565	692	196	+496	685	498	+ 187	7,800	8,524	− 724
6	Tarikere	70,498	79,472	−8,974	−11·29	+12·47	9,819	10,990	−1,171	128	280	−152	6,883	6,799	+ 84	2,086	2,111	− 25
7	Koppa	34,943	37,134	−2,191	− 5·90	+ 2·74	29,806	29,891	− 85	102	183	− 81	15,810	18,256	− 2,446	5,304	4,493	+ 811
8	Yedehalli	16,710	17,693	− 977	− 5·56	− 1·37	...	...	...	...	...	...	...	...	...	...	...	...
9	Mudgere	43,353	46,212	−2,859	− 6·19	+11·72	22,920	22,965	− 45	37	8	+ 29	23,102	21,675	+ 1,427	1,260	2,144	− 884
10	Sringeri	9,896	10,656	− 760	− 7·13	+16·54	...	...	...	...	...	...	...	...	...	...	...	...
11	Sorab	66,605	71,493	−4,888	− 6·84	+ 2·06	50,873	48,335	+2,538	1,107	1,088	+ 19	...	...	...	36	1,410	−1,374
12	Sagar	51,049	56,818	−5,769	−10·15	− 3·70	35,320	30,509	+4,811	927	456	+471	4	3	+ 1	3,590	4,293	− 703
13	Nagar	37,656	40,455	−2,799	− 6·92	− 5·57	28,770	27,765	+1,005	301	228	+ 73	42	44	− 2	2,246	2,838	− 592
14	Thirthahalli	54,724	57,553	−2,829	− 4·92	− 2·83	32,309	31,666	+ 643	203	223	− 20	150	249	− 99	5,294	6,584	— 1,290
15	Shikarpur	63,074	63,604	− 530	− 0·83	− 1·24	36,671	38,165	−1,494	2,464	2,855	−391	...	35	− 35	1,360	2,256	— 896
16	Shimoga	74,924	73,012	+1,912	+ 2·62	− 4·75	32,509	33,443	− 934	1,031	1,205	−174	130	12	+ 118	1,250	1,416	— 166
	Kumsi	17,124	18,627	−1,503	− 8·07	+ 5·94	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	9,09,503	9,56,103	−46,600	− 4·87	...	3,73,801	3,76,258	−2,457	7,123	7,768	−645	1,03,500	1,25,423	− 21,923	34,992	39,701	−4,709

TABLE I (*b*).

Shows the population of some selected castes in the three '*Malnad*' districts, *viz.*, Hassan, Kadur and Shimoga in 1901 and 1911 with variation in percentage.

Serial No.	Caste	Hassan				Kadur				Shimoga				Total for the three districts			
		1901	1911	Difference		1901	1911	Difference		1901	1911	Difference		1901	1911	Difference	
				1901-1911	Percentage			1901-1911	Percentage			1901-1911	Percentage			1901-1911	Percentage
1	*Vokkaligars.*																
	Males	84,764	91,031	+6,267	+ 7·38	26,752	25,016	−1,736	− 6·11	48,045	46,996	−1,049	− 2·18	1,59,561	1,63,043	+3,482	+ 2·18
	Females	88,439	95,175	+6,736	+ 7·61	23,508	21,976	−1,532	− 4·31	42,401	41,190	−1,211	− 2·85	1,54,348	1,58,341	+3,993	+ 2·58
	Total ...	1,73,203	1,86,206	+13,003	+ 7·50	50,260	46,992	−3,268	− 6·50	90,446	88,186	−2,260	− 2·69	3,13,909	3,21,384	+7,475	+ 2·38
2	*Holeyars.*																
	Males	46,132	45,706	— 426	− ·92	30,198	29,237	− 961	− 3·18	16,067	14,459	−1,608	−10·00	92,397	89,402	−2,995	− 3.24
	Females	46,836	46,022	— 814	− 1·75	25,938	25,035	− 903	− 3·48	14,729	13,252	−1,477	−10·02	87,513	84,309	−3,204	− 3·66
	Total ...	92,978	91,728	−1,240	− 1·34	56,136	54,272	−1,864	− 3·32	30,796	27,711	−3,085	−10·01	1,79,910	1,73,711	−6,199	− 3·44
3	*Lingayats.*																
	Males	41,694	42,069	+ 375	+ ·89	34,929	33,272	−1,657	− 4·74	60,052	58,459	−1,593	− 2·69	1,36,675	1,33,800	−2,875	− 2·10
	Females	41,701	43,191	+1,490	+ 3·59	35.528	33,901	−1,627	− 4·57	59,260	56,868	−2,392	− 4·03	1,36,489	1,33,960	−2,529	− 1·85
	Total ...	83,395	85,260	+1,865	+ 2·18	70,457	67.173	−3,284	− 4·66	1,19,312	1,15,327	−3,985	− 3·33	2,73,164	2,67,760	−5,404	− 1·97
4	*Brahmins*																
	Males	9,487	9,745	+ 258	+ 2·71	9,402	8,665	− 737	− 7·83	13,626	13,187	− 439	− 3·23	32,515	31,597	− 918	− 2·82
	Females	9,846	9,899	+ 53	+ ·53	8,851	8,111	− 740	8·36	12,472	12,469	− 3	− 0·02	31,169	30,479	− 690	− 2·21
	Total ...	19,333	19,644	+ 311	+ 1·09	18,253	16,776	−1,477	− 8·09	26,098	25,656	− 442	− 4·69	63,684	62,076	1,608	− 2·52

5	*Musalmans.*																	
	Males	8,890	9,425	+ 535	+ 6·01	10,270	9,457	− 813	− 7·91	17,123	17,899	+ 776	+ 4·53	36,283	36,781	+ 498	+ 1·37
	Females	7,778	8,348	+ 570	+ 7·32	7,874	7,123	− 751	− 9·53	15,470	16,349	+ 879	+ 5·68	31,122	31,820	+ 698	+ 2·24
	Total ...	16,668	17,773	+1,105	+ 6·62	18,144	16,580	−1,564	− 8·61	32,593	34,248	+1,655	+ 5·07	67,405	68,601	+1,196	+ 1·77
6	*Panchalas.*																	
	Males	7,610	7,646	+ 36	+ ·47	5,062	4,487	− 575	−11·35	8,177	7,910	− 267	− 3·26	20,849	20,043	− 806	− 3·86
	Females	7,409	7,436	+ 27	+ ·36	4,187	3,631	− 556	−13·27	6,698	6,428	− 270	− 4·03	18,294	17,495	− 799	− 4·36
	Total ...	15,019	15,082	+ 63	+ ·41	9,249	8,118	−1,131	−12·22	14,875	14,338	− 537	− 3·61	39,143	37,538	−1,605	− 4·10
7	*Madigars.*																	
	Males	6,166	6,582	+ 416	+ 6·74	6,476	7,530	+1,054	+16·27	11,006	11,997	+ 991	+ 9·00	23,648	26,109	+2,461	+10·40
	Females	6,098	6,976	+ 878	+14·39	6,157	6,784	+ 627	+10·18	10,961	11,547	+ 586	+ 5·34	23,216	25,307	+2,091	+ 9·00
	Total ...	12,264	13,558	+1,294	+10·54	12,633	14,314	+1,681	+13·30	21,967	23,544	+1,577	+ 7,13	46,864	51,416	+4,552	+ 9·71
8	*Christians.*																	
	Males	1,964	1,971	+ 7	+ ·30	2,665	3,042	+ 377	+14·14	1,117	1,514	+ 397	+35·54	5,746	6,527	+ 781	+13·59
	Females	1,831	1,857	+ 26	+ 1·41	1,223	1,500	+ 277	+22·64	850	1,001	+ 151	+17·76	3,904	4,358	+ 454	+11·62
	Total ...	3,795	3,828	+ 33	+ ·86	3,888	4,542	+ 654	+16·82	1,967	2,515	+ 548	+27·85	9,650	10,885	+1,235	+12·69
9	*Lambanis.*																	
	Males	1,658	2,006	+ 348	+20·98	4,698	2.999	−1,699	−36·16	8,830	6,045	−2,785	−31·54	15,186	11,050	−4,136	−27·23
	Females	1,618	1,904	+ 286	+17·67	3,890	2,663	−1,227	−31,54	8,368	5,626	−2,742	−32·76	13,876	10,193	−3,683	−26·75
	Total ...	3,276	3,910	+ 634	+19·35	8,588	5,662	−2,926	−34·07	17,198	11,671	−5,527	−32·13	29,062	21,243	−7,819	−26·90

Table I (*a*) shows the distribution of population in the *malnad* taluks of Kadur, Hassan and Shimoga, the percentage of variations during the last two decades and the contractions in the areas under coffee, paddy, orchards and sugarcane, the four important crops of the forest districts. It will be noticed from a study of that table that there has been a general decline in the population in the pukka *malnad* taluks, whereas in those like Arkalgud, Kadur and Shimoga, which comprise also some maidan tracts, there has been an increase. On the whole there has been a fall of 46,600 persons during the last decade in the 17 taluks of the list. Greatest reduction, *viz.*, 8,974 has taken place in Tarikere and next in order are:—8,637 in Chikmagalur, 5,554 in Belur, 5,769 in Sagar and 4,888 in Sorab. During the previous decade, the taluks of Sagar, Nagar, Thirthahalli and Yedahalli suffered a reduction, *i.e.*, there has been a general decline in the population for the last 20 years in Sagar, Nagar, and Thirthahalli.

Such a large reduction in population warrants a much more detailed study than what I could undertake in connection with my present work. I will, however, note down whatever information I have been able to gather on the subject and examine a few of the various points mentioned by the people as bringing about this decline in the number of the inhabitants of the *malnad*. The causes that are reported to operate are due either to natural surroundings, to changes in the habits of the people, economic or social, and to religious conservatism.

(1) Insanitary surroundings of the forest region is perhaps the first and most important cause, especially as affecting the lower working classes. Other causes are:—
(2) Greater number of deaths among the female population, especially from child birth, at ages ranging between 20 and 30 years.
(3) Deaths of babies between 5 to 60 days old.
(4) Disinclination to take European medicine and want of a proper system of Ayurvedic medicine in place.
(5) Change in the ideals of many in using *duppatties* or cotton blankets in place of the old woollen ones or the *malnad kambli*.
(6) Drinking habits and general indolence.
(7) System of *thera* or money present required to be paid to bride's parents, by which many women remain unmarried up till middle age.
(8) Low earning capacity with consequent difficiency of food and inability to resist attacks of disease.
(9) Growth of lantana.

A detailed enquiry into all these points is not attempted here. I will confine myself to a brief examination of the extent to which the several working classes are affected.

A study of the distribution of population according to Table I (*b*) shows that, in the Kadur and Shimoga districts, the fall has been general, though in the Hassan district, there has been a general rise among the Brahmins, Lingayats, Vokkaligars and Madigars and a fall among the Holeyars.

DECREASE IN THE HOLEYA POPULATION.—A study of that statement shows, at a glance, that the ***Holeyars***, as a class, have been decreasing in number, male and female not only in Kadur or Shimoga but also in Hassan, where the other castes have been adding to their number. There has been a reduction of as many as 6,199 persons in their population, during the decade, out of nearly 1,79,910 persons in 1901, that is, one in every 30 approximately. The decrease is greatest

in the Shimoga district, *viz.*, 10 per cent, 3·32 per cent in Kadur and only 1·34 in Hassan.

VOKKALIGARS.—Next to *Holeyars*, the *Vokkaligars* or agricultural population are going down in the Kadur district, the reduction in numbers is as many as 3,268,or 6·5 per cent during the decade, the loss among the males being greater 6·11 per cent, than among the females, 4·31 per cent. Among the Lingayats there is a general fall of 3,284 persons, or 4·66 per cent in the Kadur district, and 3,985 or 3·3 per cent in Shimoga.

MADIGARS.—The *Madigars*, as a class, seem to posses a greater capacity to resist the insanitary surroundings of the *malnad* than the other caste men. This is shown by the fact that whereas the other castes have invariably decreased in number in the two districts of Kadur and Shimoga, *Madigars* have not only not decreased but have been actually adding to their population and it is note-worthy a fact that the greatest addition 13·3 per cent to their population has occurred in the Kadur district, which is unfavourable to other classes. Another note-worthy fact is that in the Hassan district, the *Madigar* female population has increased more than the male by about 14.39 per cent as against 6·74 per cent in the male.

Lastly out of the remaining populous classes of Kadur and Shimoga, *viz.*, the Mussalman and the Christian, the female population is very much less than that of the male. This large difference is perhaps attributable to the fact that many of the excess males are *moplas* from the West Coast and *lubbes* from Vaniambadi, periodically migrating into the State and returning to their homes just before the south-west monsoons set in; otherwise such large difference between the number of males and females cannot be easily explained.

DECREASE IN THE FEMALE POPULATION.—Decrease in the female population was assigned as one of the causes that led to the depopulation of the *malnad.* Census figures show that in the districts of Kadur and Shimoga, the number of females was generally less than that of the male, among *Holeyars, Vokkaligars, Lingayats* and *Brahmins* in the year 1911 and it has decreased since 1901. As many as 10 per cent of the *Holeya* females disappeared in the Shimoga district during the decade and about 8·36 per cent among the Brahmin females of the Kadur district, 4·5 per cent of the *Lingayats*, beside 4·31 of the *Vokkaligar* females of the same district. Even in the Hassan district where there is a general rise in the population of all the classes and also among the females, the *Holeya* females are decreasing. Among the *Lingayats* the loss of female population is greater in the Kadur district, 4·57 per cent than in Shimoga, 4·03 per cent.

The *Lambanies* have lost 1,227 or 31·5 per cent of the females in Kadur, 2,742 or 32·76 per cent in Shimoga and that is perhaps an important source contributing to the reduction of the female population of the Western Division.

A few facts are prominently brought forward by this preliminary enquiry. As the matters stand at present, the two districts of Kadur and Shimoga do not favour growth of population. The forest surroundings greatly tell upon general health and it is more so in Kadur than in Shimoga. The great decrease in the number of working classes is due partly to location of their huts or houses. They generally live in low lying tracts so as to be near their fields. Lantana growth harbours wild pigs and to drive off these, the *holeya* or other cultivator has to keep a constant watch at nights and that near the wet rice fields. He does not protect himself well. He uses *duppaties* now in place of the old *malnad kumbli.*

Besides these insanitary surroundings, it is stated that the working man is insufficiently fed, for two reasons. Increased facility of communication has come

in the way of local stores being kept up. Some of the residents of the *malnad* districts are of opinion that the old system of *serfs*, now abolished, necessitated the land lord taking care of the family of the ryot, as regards feeding ,clothing and marriage, and that the independence secured now has demoralised him.

The decline in female population is attributed to greater mortality during child birth. The local practice of administering some medicine, the effect of which is to increase thirst, is, according to some, responsible. The women, it appears, are denied water and they often die of mere thirst.

System of *thera* with its attendant evils is also a cause for the decrease in female population, as well as for the total decrease. Greater mortality among the babies, especially between 5 and 60 days, is reported to be another.

DECREASE IN CULTIVATION.—It is no wonder that, with such a large reduction in the population of the working classes, the cultivation of land also decreased. For example, area under coffee fell by about 22,000 acres during the decade 1901-11, the greatest decrease of 14,500 acres having taken place in the Manjarabad taluk, which lost about 9,000 persons during the period. The next greatest decrease 4,000 acres occurs in the Chikmagalur taluk.

Area under paddy had not decreased to any appreciable extent on the whole, great contraction in the area in some taluks like Belur being made up by a general expansion in the *pukka malnad* taluks of Sorab, Sagar, Nagar, Thirthahalli and Chikmagalur.

There is a great fall of about 4,600 acres under areca, from 39,600 to 35,000 acres, during the decade. The decline is most noticeable in the taluks of Sorab, Thirthahalli, Nagar, Shikarpur, Mudgere and in Kadur, as against the slight rise in the Koppa, Arkalgud and Belur taluks and it means a loss of income to the people of those parts by not less than about 9 lakhs of rupees every year, besides the greater loss of the large sums of money spent on the gardens.

Contraction under sugar cane is not very appreciable since the figures for the two years stand at 7,768 and 7,123 acres, for the 16 taluks.

Suggestion.—(i) I would like to record a suggestion that, pending the construction of numerous hospitals, a motor service be organised immediately by Government to serve as itinerant hospitals for Kadur, Shimoga and Hassan, specially selected officers being deputed for the work.

(ii) Village sites might be removed to better quarters, wherever practicable.

Planting of the *thulasi*-Ocimum sanctum, the sacred basil, round the village sites and in the backyards of houses might be tried, as according to Sir George Birdwood,* the plant is supposed to have certain "virtues in disinfecting and vivifying malarious air" and that consequently "it first became inseparable from Hindu houses in India."

Another natural and simple remedy appears to lie in planting *Eucalyptus globulus* round villages and in the marshy tracts close by. It appears that† in marshy districts near to Eucalyptus forests intermittent fevers are unknown, a result attributed either to the neutralisation of the effluvia by the aromatic emanations from the tree or to the sweetening of the stagnant waters by the leaves, etc., that fall into them. It appears also that the number of Eucalyptus plantations was increased near the marshy and insalubrious districts of Corsica and Algeria.

The *tulasi* plant yields an essential oil which has an extensive sale in Europe. The plantations would thus serve two objects, hygienic and industrial. The indu-

* The Art of Perfumery by Piesse, page 97.

† The Useful Plants of India by Col. Drury, page 200.

stry is a comparatively simple one, falling within the means and capacity of the more intelligent of the richer people of the *malnad*. The ryots could grow, collect and supply the oil manufacturer with the herb and earn an additional income.

The Eucalyptus plantations suggested would likewise support an industrial population, as the leaves yield by distillation an essential oil, used in scenting soap and also in pharamacy.

I would commend these suggestions to the notice of the Forest Department and of the Economic Botanist.

(iii) Opening up of the *malnad* by organising a motor service would be another step, which would favour the permanent settlement of labourers and others in the *malnad* and increase the population.

If, later on, railways could be opened so as to connect the State with the West Coast by way of Marnahalli ghat in the Hassan district and by Agumbe and Gersoppa in the Shimoga district, a permanent increase in the population could be assured.

(iv) As suggested under "Agricultural and Industrial possibilities of the *malnad*" special encouragements should be offered to such of the landed proprietors who are enterprising enough to apply capital and machinery to the cultivation of land and to the subsequent preparation of the produce. This step will stimulate the settlement of more people in the forest tracts.

(v) The starting of the various forest industries suggested elsewhere would also have the same effect.

(vi) A little education by sympathetic and pursuasive kind of talk would popularise the use of European medicine, to fight the malaria.

(vii) The system of *thera* prevalant in most parts works against any chances of increasing the population, inasmuch as the parents of most of the grown up girls would not get their daughters married unless a dowry up to Rs. 400 is paid. Many of the bride-grooms are poor and they find it practically impossible to meet the heavy demand and, it appears, that many cases have come to the notice of Magistrates where such grown up and unmarried women are entangled in criminal cases, being charged with attempting infanticide or abortion.

This *thera* system might be abolished gradually through the work of the people themselves, by educating them to its numerous disadvantages and evils.

(viii) The growth of lantana which is now a great menace to all cultivation in the *malnad* must be checked. From enquiries made at Koppa I learn that attempts at eradicating the plant even from the backyards of houses have not been successful, although Rs. 50 and more were spent for merely clearing a small area of 2 to 3 guntas.

It seems to me that Government should encourage the invention of a device by which the lantana growth could be considerably reduced. The *malnad* people are of opinion that attempts at encouraging the ryots to clear their fields of lantana by offering rewards in the form of special hatchets has not met with much success. I would suggest the invention of a device by which the main stem of the wild plant could be easily cut by a man standing at a distance by a specially prepared knife fixed on to the end of a rigid rod, the rod working inside a long narrow tube of about 2 to 3 inches in diameter and supported by a tripod stand, made of iron, and capable of being folded along the length of the tubing.

The cutting should be done when the plant is not bearing seeds so as to prevent the seeds spreading and germinating during the next rains.

The plant thus cut should be left to dry and then collected for fuel.

The fuel, if large, might be utilised to prepare charcoal or generate some kind of power to be transported to a point where it might be required. If a man could conveniently destroy about 100 bushes per day, much clearing could be done. Dry fields will then be saved and fresh growths in the fields will be weeded out along with other useless plants. If a steam plough could be worked by this lantana fuel, the roots left might be removed and the land kept clear and also cultivated.

As to the measures to improve their present economic condition, suggestions have been offered elsewhere, under " Economic Condition of the *malnad* ryot."

Occupation or means of Livelihood.

The whole occupation scheme is comprised under four main classes, *viz.*, Production of Raw Materials, Preparation and Supply of Raw Materials, Public Administration and Liberal Arts and Miscellaneous.

The number of persons engaged in the *production of raw materials* increased by 5·37 lakhs from 37·61 in 1901 to 42·98 in 1911 or by 14·3 per cent, whereas a reduction is noticed in the numbers under the three other classes, *viz.*, by 91,466 persons under the second class, by 1,104 under the third and by 1,78,226 under the fourth or miscellaneous. The total reduction under the last three heads is 2·7 lakhs, while the total increase under the first is 5·37 lakhs. The difference between these two figures gives the increase in population during the decade, *viz.*, 2⅔ lakhs or 4·8 per cent.

From these figures the inference may be drawn that a greater number of persons returned themselves as agriculturists in 1911 than in 1901, since almost the whole number under production of raw materials is engaged in agriculture.

Even under the first class, *viz.*, production of raw materials, all the orders of occupations have not only not drawn more people but have actually suffered considerable reduction. The greatest fall is noticed under the order *Raising of Farm stock* by nearly 49,000 persons, especially under *sheep, goat and pig breeders* as well as under *herdsmen, shepherds and goat-herds.* This great disparity between the two numbers of persons *raising farm stock* at the ends of the decade must be due to changes in the classification, since the number of livestock has actually increased during the decade.

The next great fall is noticed in the case of *growers of special products and market gardening* especially those engaged in the cultivation of fruits, flower, vegetables, betel-vine, areca-nut, etc. There were 46,000 persons supported by this occupation in 1901 and only 21,000 in 1911 or a reduction of nearly 25,000 persons has taken place. This fact might partly explain the reduction in the export of " Provisions " which originally included *fruits and vegetables.*

Even under ordinary cultivation, there is a very great fall in the number of persons supported by working as *farm servants* and *field labourers* and the fall is nearly 50 per cent of the number in 1901. Evidently, a good number of these people have declared themselves as ordinary cultivators and consequently classed under that head. Otherwise, it would mean a very serious reduction in the area under cultivation which is not the case.

There has been an increase of nearly 39,000 persons supported by *extraction of minerals.* Most of these constitute the mining population of the Kolar Gold Fields, a much smaller number or proportion living as labourers and others on the Manganese Mines near Kumsi. The reduction by 1,684 persons engaged in collecting earth salt indicates a great falling off, by over 43 per cent, in this activity which is confined mostly to parts of the Chitaldrug district. The import of salt is, however, stationery so far as value is concerned.

Under the second class *preparation and supply of material substances*, there is a fall by over 90,000 persons from about 8 lakhs in 1901 to about 7·1 in 1911. *Industrial occupations* and *trade* support the main bulk of the people under the second class, the occupation of *transport* supporting only 31,000 to 33,000 persons.

INDUSTRIAL OCCUPATIONS.—Under this sub-class, there is a considerable falling off in the number of persons supported, *viz.*, over 46,000 from 4·89 lakhs to 4·43 lakhs.

This sub-class is divided into 14 orders.

Arranged in decreasing order of numbers, the 14 orders with the population supported by each are as follows :—

(1)	Industries of dress and toilet	177
(2)	Textiles	175
(3)	Industries of luxury	92
(4)	Building industries	84
(5)	Wood industry	70
(6)	Ceramics	46
(7)	Metals	40
(8)	Food industry	40
(9)	Industries in refuse matter	16
(10)	Chemical products	12
(11)	Hides and skins	7
(12)	Construction and means of transport...	2
(13)	Production and transmission of physical forces	2
(14)	Furniture	1

Industries of dress and toilet provided employment and means of subsistence to 177 persons out of every 10,000 in 1911, while the textiles, ranking next, supported 175.

Increase in the number of persons supported is noticed in the case of the occupations enumerated below :—

Excavators, plinth builders and *well sinkers* show the greatest increase by 8,207 persons. Next follow workers in precious stones by 6,580. The others in order are :—*Manufacturers* and *refiners of vegetable and mineral oils*, 3,505; those living on wool, 3,250; tailors 2,376; potters 2,047; barbers; 1,905; butchers 362; sugar-makers 358; furniture makers 261; sweatmeat makers 40.

In all other cases there has been a decrease.

The greatest reduction of 16,227 persons is noticed in the case of *stone and marble workers,masons and bricklayers* from 43,930 in 1901 to 27,793 in 1911. This is hardly explicable considering the great building activity both in Bangalore and Mysore, unless it be that the reduction is attributable to the completion of the Palace works and of the Marikanave Dam and to the consequent return of the numerous workers in marble, stone, etc., to their native places in Northern India. It appears that even this will not fully explain the great falling off. A change in the classification might, perhaps, also be a cause.

The next great reduction by 11,277 persons is stated to occur under *sweepers, scavengers, etc.*

TEXTILES.—The total number of persons supported by this occupation fell by about 4,500 during the decade and considering that the business of workers in wool has expanded so as to support 3,250 persons more than in 1901, there must have been a great reduction under the other items.

The practical disappearance of the industry of hand-ginning of cotton is indicated by the reduction in the number of persons supported thereby by nearly a thousand, leaving only 163 persons in 1911 depending upon this industry.

The most important item under textiles is *cotton spinning and weaving* and a fall in the number of persons supported by these industries by about 5,000 persons from 83,489 in 1901 to 78,297 in 1911 is due more probably to the increased activity in cotton spinning in the two mills tending to decrease the hand spinning industry than to any contraction in the work of handloom weaving in the State.

The contraction in the number of *silk reelers and weavers* by about 1,830 persons during the decade is not explicable.

That the work of the village tanner has contracted is borne out by the falling off in number by 1,900 while the work of the village chuckler has suffered a worse fate as there were only 2,945 persons in 1911 as against 5,762 in 1901.

The work of *sawers, carpenters and basket-makers* has also contracted though not to a very great extent. The same remark applies to workers in iron, *viz.*, blacksmiths.

Workers in brass, copper and bell metal are also losing their ground, since there are only about 1,600 of them now as against nearly 2,500 ten years ago.

Manufacturing and refining of vegetable and mineral oil seem to have expanded as the persons supported thereby have increased in numbers by over cent per cent from 3,286 in 1901 to 6,791 ten years later. This is not quite consistent with the fall in the number of wooden or stone oil mills in the State.

Among food industries, the occupation of rice pounding and flour grinding has diminished, mainly due perhaps to the establishment and working of several rice mills since 1901 and of flour mills also.

The falling off by nearly 3,800 in the number of persons who follow toddy drawing as an occupation may be due probably to the more rigorous enforcement of the Excise rules.

Out of the four sub-orders under *industries of dress and toilet*, the *tailors and barbers* have increased in numbers while the *washerman and the town chuckler* preparing shoes, boots and saddles, are losing their ground, although the work of the washerman has no reason to fall in disfavour.

Of the industries of luxury, *workers in precious stones and in metals* like gold and silver have increased by nearly 6,600 during the decade from about 44,000 in 1901 to over 50,000 in 1911, indicating that the people have yet to be convinced of the reproductive character of money applied to business.

The great fall in the number of persons supported by *sweeping, scavenging, etc.*, by over 11,000 in number does not admit of a ready explanation, unless the difference is accounted for by changes in the classification in the two Censuses.

TRADE AS AN OCCPATION supported 2,78,772 persons ten years ago while in 1911, the number fell by over 42,000 persons or 15·3 per cent. The greatest fall has occurred in the number of persons trading in *other sorts, viz.*, by 66,000 or 74·3 per cent from 88,670 to 28,700.

Greatest increase is noticed in the number living upon *trading in food stuffs* from 90,916 to 1,30,518 or by 43·6 per cent. *Grocers and sellers of vegetables and vegetable oils and condiments* have increased by nearly 46,000 between the two Censuses.

Dealers in firewood and charcoal have increased by 4,600 persons.

The profession of *money lenders, Bank Managers, etc.*, has expanded by 10·6 per cent, *i.e.*, more than the expansion in the total population and this fact coupled

with the general decline in the profession of trading may perhaps be taken to mean a greater dependence of the ryot population on borrowed capital for their agricultural and other needs than in 1901. The reduction in the number of *brokers, commercial travellers, etc.*, by nearly 56 per cent from 3,846 to 1,698 is in accordance with the general fall in the number supported by trade.

Persons supported by *trade in piece goods* decreased in numbers by 16 per cent, from 27,500 to 23,000 and this is not quite consistent with the expansion in the quantity and value of trade in piece goods, unless the trade required more capital and consequently passed into the hands of a fewer but wealthier people.

The increase in the number of *traders in skins, leather, etc.*, by nearly 97 per cent from 2,383 to 4,686 means that the exploitation of the State by *Lubbes* from Vaniambady and other places for skins and hides has nearly doubled in the decade between 1901 and 1911. This exploitation coupled with the loss of means of livelihood to nearly 5,000 people over and above those engaged as village tanners and chucklers in 1911 is a point for serious consideration, especially when we remember that the field is wide and is besides highly remunerative and that there is a large population of *Musalmans, Holeyars and Madigas*, besides Mochis who can all be engaged in this trade and manufacture but who are now unable to enter the field, owing to a wide spread and powerful organisation of the *Lubbes* from tanners and exporters of leather on a large scale to itinerant coolies engaged in collecting hides and skins from every nook and corner of the Province.

Suggestion.—In the existing industrial schools or those that may be especially started, the following subjects might be taught:—

(1) Some of the essential points in the art of preserving skins and hides for transport.

(2) Tanning on improved lines to produce leather for preparation of articles mainly for local consumption; and

(3) Increase in the manufacture of such articles by the greater use of leather stitching machine, like the Singer's Sewing Machine.

These and several other points might very profitably be introduced, both into the existing Panchama Schools where Musalman boys may also be admitted. Co-operative principle should be kept in view in supplying small machines for sewing leather articles.

There is a slight increase in the number of people living by trade in wool and in metal and more so in the latter by cent per cent from 500 to 1,000 persons in the course of the ten years.

Although the *Kumbara* or *Potter* population increased by over 2,000 persons in the decade, there is a considerable fall by 85 per cent in the number supported by *trade* in pottery from about 3,600 to 550.

Five thousand less people were returned as being supported by trade in chemical products during the Census of 1911 than in the previous Census, while the volume of external rail-borne trade in chemical products has expanded. These two facts put together show that the profits of the business are being confined to a smaller number of perhaps wealthier people than previously; and if wide spread distribution of wealth among the general population be considered desirable, then the trade in chemical products is not in accordance with that ideal.

The same remark applies in the case of trade in textiles and others, where a contraction in the number of persons supported has occurred, notwithstanding the expansion in business as indicated by the quantities and value of the articles traded in.

One would have expected to find an increase in the number living by hotels, resturants, etc., but the Census figure show a decrease, although a small one about 4 per cent from about 12,000 to 11,600.

Of the other *traders in food stuffs*, *grocers* have increased enormously by 311·3 per cent from about 15,000 people to 61,500. There were 6,000 more people supported by *selling milk*, *butter*, *ghee*, *etc.*, in 1901 than in 1911, the reduction being 41·5 per cent, from 14,000 in 1901 to a little over 8,000 in 1911. *Sellers of betel leaves*, *vegetables*, *fruits*, *etc.*, have remained practically stationary, although *growers of fruit*, *flower*, *vegetables*, *etc.*, decreased by over 25,000 people and the export trade in fresh vegetables and fruits, etc., rose in value from 11 to 15 lakhs in the two halves of the decade, with the quantity of export remaining practically stationary.

Trade in clothing and toilet articles provided means of livelihood to a greater number in 1911 than in 1901. *Trade in hardware*, *cooking utensils*, *etc.*, appears to be confined to a much smaller number of persons, *viz.*, 1,940 in 1911 while ten years previously as many as 8,234 persons found means of livelihood in such trade but the quantity and value of trade in these articles do not appear to have fallen in the same ratio.

Dealing in firewood and charcoal has been the source of livelihood to over 4,600 persons over and above the number supported in 1901.

There is a decrease in the number of *dealers in precious stones and in common bangles*, *etc.*, from 12,612 to 9,531.

CHAPTER I.

RESOURCES—GENERAL AND AGRICULTURAL.

RESOURCES IN GENERAL.

The industrial possibilities of a country are two fold—improvement of the industries already in existence and organisation of new ones. A study of the resources is a necessary preliminary for both, while schemes having for their object the betterment of the actual industrial conditions should have for their foundation a study of the industries, as well as of the resources.

This survey is, therefore, begun with a preliminary sketch of the resources of the State.

Material resources

The resources of a country fall naturally under two main divisions—raw materials and power. Raw materials are derived from all the three Kingdoms of Nature, Vegetable, Animal and Mineral. Those under the first two fall under agriculture and forest, while the materials under the third comprise chiefly of coal, ores of metals and other mineral substances of commercial value, derived from the earth.

Power resources.

The various natural sources of power are coal, mineral oils, wood fuel, water falls and wind. The first two do not occur in the State and the heavy railway freight even in the case of Indian coals precludes their extensive use in Mysore for industrial purposes and it would certainly be very desirable indeed if the future requirements in power supply could be met from the local resources in wood fuel, in water falls and in wind.

Chapters I—III, Part I, deal with the three divisions of the resources in materials, while a sketch of the Mysore resources in power is given in Chapter IV.

Material Resources.

Agricultural.

The most important raw materials raised from agricultural operations fall under two main classes, the food crops, such as rice, ragi, cholam and industrial crops like cotton, mulberry, coffee and oil-seeds while raw materials like wool, hides and skins and others from the Animal Kingdom may also be considered as falling under agriculture.

Forest.

Those from the forests comprise teak and other timber, sandalwood, fire-wood, match-wood, wood for distillation, wood for walking sticks, packing cases, and other miscellaneous substances such as gums and resins, dyes and tans, fibres and medicinal plants and herbs.

Mineral.

Mineral resources embrace gold, ores of iron, manganese and chromium, besides mica, asbestos, corundum, pot stone, china clay and ochres, clay for tiles and bricks, stones for building and decoration, pyrites, soda and others for chemical industries.

Localised Occurrence of the Materials.

Many of the raw materials, produced or occurring in the State, are more or less confined to particular areas or tracts therein, *i.e.*, there is a special zone where a particular material occurs or is grown more largely than in others.

Ragi.

In the case of agricultural products, about 75 per cent of the "Ragi" grown in the State is raised from four out of the five districts of the Eastern Division.

Rice. Paddy is grown more largely in the Western Division or *malnad* and in Mysore than in others, and cholam is grown mainly in the districts of Chitaldrug, Mysore and the *maidan* taluks of Shimoga.

Cholam.

Sugar-cane. Sugar-cane is cultivated over greatest areas in the Hassan and Kolar districts, Shimoga and Mysore following next.

Oil-seeds. Oil-seeds are grown over larger tracts in the Mysore, Tumkur and Chitaldrug districts than in others.

Cotton zone. The localization is very marked in the case of some of the industrial crops like cotton, wool and silk. Chitaldrug district with Pavagada from Tumkur, and Chennagiri and Honnali from Shimoga constitutes the cotton zone of the State. Over $\frac{7}{8}$ths of the total area under cotton is comprised in this zone.

Silk zone. The stretch of the country comprising parts of the taluks of Nanjangud, Chamarajnagar, T.-Narsipur, Malvalli, Mandya, Closepet, Chennapatna and Kankanhalli and parts of Kunigal and Magadi with some special tracts of the Kolar district form the silk zones, mulberry not being grown elsewhere in the State.

Wool. Production of wool from shearings of sheep is predominant in the Chitaldrug district and in some parts of Tumkur.

Coffee. Production of coffee is confined to the districts of Kadur and Hassan.

Cocoanut. Cocoanut is mostly produced in a belt of country with Tiptur for its centre and composed of the taluks of Chiknayakanhalli, Arsikere, Kadur, Gubbi and Tumkur and outside this area in the parts of Hosdurga and Chennapatna taluks.

Areca-nut Areca-nut is produced to the greatest extent in the *malnad* districts of Shimoga, Kadur and Hassan and in the main cocoanut tract.

Pepper. Pepper is confined to the areca-nut gardens of *malnad* and to the *khan* jungles of Sorab and Sagar.

Teak. A similar localisation is also noticed in the case of some of the important forest resources; growth of teak is confined to the mixed zone of forests in the *malnad* and to a few other localities in the *maidan* country. But its most luxuriant growth is restricted to the forest areas in the districts of Mysore, Kadur and Shimoga.

Sandal. Sandalwood grows along particular belts in the *malnad* and its growth is least in the districts of Chitaldrug and Kolar.

Gold. Gold in Mysore is confined mostly to quartz reefs in dark hornblende schists of the Dharwar age, as in the Kolar Gold Fields.

Manganese. Ores of manganese, though associated with hematitic and limonitic ores in these schists, are concentrated to the greatest extent near Kumsi and in a few other parts of the Shimoga and Chitaldrug districts.

Chromite. Chromite in a more or less pure and payable form was quarried from the ultrabasic rocks developed to a large extent near Kadakola, in the Mysore taluk.

This tract is the only one in the State where lumps and masses of pure chromite are found.

Magnesite This is also the area where magnesite deposits occur in commercial quantities.

Regions where most of these occur or are grown are roughly indicated in Plates I and II.

AGRICULTURAL RESOURCES.

An account of the material resources of Mysore is best begun with those derived from agricultural operations. For, the Mysore Province like the rest of India is, in the main, an agricultural country, supplying most of the raw materials available for industrial operations.

Food and [illegible] the first and most important necessities [illegible] study of the re[illegible] claims precedence over the [illegible]

Statistical [illegible] ng the areas under some [illegible] appended in the [illegible] Plates IV to VI and XIII [illegible] to statements an[illegible] districtwar variations in [illegible] crops.

Production and Consumption of Articles of Food.

Table I (c) gives the average annual values, in lakhs of rupees, of the Mysore railborne transfrontier traffic in the chief food grains, for the two decades 1890-91 to 1899-1900 and 1901-02 to 1910-11.

A study of the figures in that table discloses several points for consideration.

Retrogression of trade in food grains.

One of the points is that, as regards trade in food grains, the position of the Mysore State has undergone a complete retrogression in the course of the 20 years, ended 1910-11.

For, whereas during the first ten years 1890-91 to 1899-00, the average value of imports of food grains into the Province was about 26 lakhs of rupees and that of exports 53 lakhs, showing a balance in favour of exports to the extent of about 27 lakhs of rupees per annum, the balance of trade during the next decade closing with 1910-11 was turned in favour of imports, by nearly 20 lakhs of rupees.

Decreasing exports of ragi, etc., and increasing imports of rice.. etc.

This reversal is due to a considerable decline in the average value of exports of *ragi* from 28·7 lakhs to 11·8 lakhs and of *cholam* from a little over 12 lakhs to 6 lakhs, making up a reduction of nearly 23 lakhs of rupees under these two heads alone. In addition, the average annual value of imports of rice doubled itself in the course of the two decades from 17½ to 35 lakhs of rupees. The value of gram and pulse sent into the Mysore State also doubled itself during the 20 years from about 4 to about 8 lakhs of rupees.

The quantities of paddy corresponding to those of rice imported are 8·8 and 15 lakhs of Bengal maunds, indicating the need there was for an average increase in the area under paddy by 55,000 acres in the first case and by 94,000 in the second.

Some possibilities.

As a matter of fact, the imports of rice into the State during the two years 1908-09 and 1909-10 rose to the maximum and represented more than ever before the need for a large increase in the area under paddy by 1·11 and 1·42 lakhs of acres, over and above the actuals for those years respectively.

There are, however, possibilities for a great part of the need in this direction being satisfied by the enhanced irrigation facilities, actual—Marikanave, Borankanave and other reservoirs—and potential, the Kannambadi Project; and more so, if special encouragement be afforded to such of the likely enterprising colonists who are willing and prepared to apply capital and machinery to agricultural developments.

An enquiry is warranted.

An enquiry into the production of paddy, ragi, cholam and other food grains now becomes necessary, since 72·4 per cent of the total population live on agriculture.

Area production and consumption of paddy.

Paddy.—Table II has been prepared to show the quantities of production and consumption of paddy in the State and the figures are calculated on the basis of the data published in the Agricultural Statistics. The table gives the quantities of production of paddy in *khandies* of 160 seers each, for the three periods between 1897-98 to 1910-11 at 27·45 lakhs, 27·95, and 28·26 lakhs, corresponding to 110,

112, 113 lakhs of Bengal maunds respectively and it could be seen that the maximum quantity corresponding to the import of rice constituted about $\frac{1}{7}$th of the production.

The consumption is, however, found to be more than the production.

The average quantities of paddy consumed per head of population expressed in measuring seers of 2 lbs. each were practically constant at about 90, while the value of that consumption per head of population rose from Rs. 4.4 in the first two periods to about Rs. 5·4 in the third, representing a rise by about 23 per cent in the value of paddy, as the quantity of paddy consumed was practically the same.

Ragi.—The decline in the volume of trade in ragi from an annual average of 13 lakhs of Bengal maunds during the first decade valued at about 29 lakhs of rupees to 4·8 lakhs of Bengal maunds worth nearly 12 lakhs of rupees suggests an enquiry if the production of ragi in the State has suffered any reduction.

Area, production and consumption of ragi.

A reference to Table III shows that the average area under ragi fell from 22 to 21·7 and then rose to 22·5 lakhs of acres during the period 1897-98 to 1910-11 as well as the average outturns from 7·45 to 7·66 and 8 annas in the rupee in the three periods, with the result that the quantity of production also increased from 33 lakhs of *khandies* or 132 lakhs of Bengal maunds to 36 lakhs of *khandies* or 144 lakhs of Bengal maunds.

Allowing for the quantities of imports and exports, the balance obtained, representing consumption, rose from 120·5 lakhs of Bengal maunds to 127·9 and 140·5 in the three periods, with corresponding money values of 229,217 and 364 lakhs of rupees respectively.

Assuming the average population to be 54, 56 and 58 lakhs for the three periods, the quantity per head of population is found to be 90 seers valued at Rs. 4 to 94 seers also valued at nearly Rs. 4 and 99·31 seers, at Rs. 6·4.

Proportion of export to production.

The quantity of export was nearly $\frac{1}{11}$th of the total production in the first period while it fell to $\frac{1}{24}$th of the same in the second and to nearly $\frac{1}{35}$th in the third.

The inference may, therefore, be safely drawn that, as regards the most important staple food grain in the State, *viz.*, *ragi*, the production has, on the whole, been on the increase, export on the decrease and the balance in favour of the ryot on the increase,both in quantity and in value; such balance probably including stores in *hagaves*.

Area, production and consumption of cholam.

Cholam and cumbu or jawar and bajra.—The quantity of export of this millet fell by 50 per cent during the two decades from 4 lakhs of Bengal maunds of 12 lakhs of rupees in value to 2 lakhs worth half the amount. In addition, there has been an increase in the imports.

Both the facts point either to a fall in the production or to increase in consumption and it is found that the areas decreased from 6·5 to 5·4 and 6·2 lakhs of acres in the three quinquennial periods, the estimated actual outturn, as expressed in annas in the rupee, also fell from 8½ to 7·7 and 7·9.

Quantity of production, increased by imports and diminished by exports, fell from 33·7 lakhs of Bengal maunds to 26·53, rising again to 33·21 in the course of the period ending with 1910-11.

The quantity per head of population was greatest in the first period, *viz.*, 25·6 seers, least in the second, *viz.*, 19·42 and 23·47 in the third.

The value of consumption fell from 1·33 to ·9 rupee in the first ten years while it rose again to 1·8 rupees during the third five year period. These figures are shown in Table IV.

Gram and pulse.—In the case of these items the export trade though small, showed a reduction, while that of import was practically doubled in value from 4 to 8 lakhs of rupees. Of gram and pulse.

Table V shows the area under *Gram and Pulse* was 7·6 lakhs of acres during the first period, while it fell to an annual average of about 6·9 and 6·0 lakhs respectively in the second and the third.

The average annual production was 23, 26 and 18 lakhs of Bengal maunds during the three periods and that of consumption per head of population 14 seers for the first four years, 16·4 for the next five and 10·8 for the last, at values of 1·5, 1·62 and 1·31 rupees respectively.

Other food grains.—Besides these, there is another in the Agricultural Statistics under the head "Other Food Grains" comprising *baragu*, *same*, *haraka*, etc. Assuming the quantities of production to be the same as that of gram and pulse, it is found, as shown in Table VI, that 16 measuring seers is the share per head of population in the first period, 19·76 in the second and 18·86 in the third, at values of 11½ annas, 13 annas and 1·2 rupees respectively. Of other food grains.

This survey of the position of the people of Mysore as regards the supply of and demand for the most important necessaries of life, *viz.*, food grains is intended to be merely the beginning of a separate and special elaborate enquiry into the economic condition of the Mysore ryot and it touches on only one of the numerous points of such an enquiry. The beginning of a special future enquiry.

Total Production and Consumption.

Table VII furnishes approximate average quantities and values of production and consumption of food grains for the three periods into which the 14 years 1897-98 to 1910-11 are divided.

It is found therefrom that the total quantities of food grains and pulse falling to the share of every person in the Mysore State is practically constant at about 240 seers per year, valued at 12 to 16 rupees, the greatly enhanced value being due to rise in prices. Quantity and value of consumption of grains and pulse per head of population.

The table shows further that the quantity of paddy consumed is practically constant at 90 seers, while that of ragi consumed per head of population has been steadily rising from 90 to 94 and 99·3 in the three periods, probably indicating a growing tendency in the Mysore ryot to store *ragi* once more in underground pits, known locally as *hagaves*. This increase, however, makes up for the fall under cholum, gram and pulse and under "others" all put together.

It will be instructive to compare these figures with similar ones derived from other sources, provided such are available.

The figures in Table VII indicate several points for note. One of such points is that the average annual consumption of food grains in each of the second and third periods is greater than the corresponding production, though the difference is comparatively small and is such that it could be easily made up and more, by any slight increase in the estimates of production of paddy or ragi. Points indicated.

Even the fact of the reduction in the area under food crops by 2·9 per cent from a quinquennial average of 0·934 acre per head of population to that of 0·907, in the two halves of the decade 1901-02 to 1910-11, would not affect the point, if the estimate of production be enhanced by 15 per cent and it appears likely that the estimates are underrated, especially under *ragi*.

Other points brought out are that, in the case of paddy, consumption has always been in excess of production, while in the case of ragi, production exceeded consumption. Less paddy and more ragi produced than is needed.

The consumption of cholum, gram and pulse, is more than the production, necessitating some net imports. The quantity of "Other Grains" produced is practically equal to the quantity consumed.

The whole question should be considered as open for decision, pending special and detailed enquiries.

Uniformity in the total quantities of consumption of food grains.

However, the close agreement between the various figures under corresponding heads in Table VII is a point for note, notwithstanding the wide variations in the anna crop from 5·0 to 9·6 in the case of ragi, 7·6 to 11·6 in the case of paddy and the large differences in the import and export quantities, besides the differences in the average population during the periods.

That the quantities of consumption per head of population should be practically constant is what might be expected and the fact that it is found to be so is a point in favour of the position as indicated by Table VII.

Jaggery.

Jaggery.—Jaggery is the only other article of food for which such figures can be calculated and this has been done and the result embodied in Table VIII.

Area, production and consumption of jaggery.

The average area under cane which was 31·8 thousand acres in the first period increased to 41·7 in the second and contracted slightly during the next to 38·7 thousand acres. The quantity of production varied accordingly from 7·47 lakhs of Bengal maunds to 10·54 and 9·7 respectively in the three periods. In order to calculate the quantity of consumption of the edible forms of sugar, so far as Mysore is concerned, the quantities of imports, embracing molasses and palmyra jaggery, have been omitted. The exports under unrefined sugar being composed entirely of jaggery powdered, balled, etc., used for human consumption are taken into calculation. Thus estimated, the quantities of consumption of sugar, jaggery, etc., for the three periods are found to be 7·04, 8·48 and 8·48 lakhs of Bengal maunds respectively.

Quantity of sugar, and jaggery consumed per head of population.

The quantity per head of population works to about ·15 Bengal maund per year or about 1 lb. per month.

The Mysore people thus consume about half a local maund per head per year of the various forms of sugar, especially cane jaggery.

Production and Consumption of Articles of Clothing and Dress.

Data for framing estimates of production and consumption.

Out of the three raw materials under *Textiles*, *viz.*, cotton, silk and wool, some information could be gathered about cotton and wool and an estimate framed of the consumption, but in regard to silk raw, no such information is available even for one year and much less for 14 years. It was with considerable difficulty that some figures were obtained from the districts, giving areas under mulberry at about 33,000 acres as shown in Table IX.

In the Administration Report for 1881 by the late Sir James Gordon, the area is given as 10,000 acres and in the Administration Report for 1911-12 the figure is given at 11,000 acres and this latter is evidently not correct. Again the quantity of yield of silk per acre is given to be 31 lbs. in 1881 and the price of silk at Rs. 686-8-0 for 80 lbs. or Rs. 265 per acre of mulberry.

An estimate of the production of silk.

This value for the production of silk from an acre of mulberry agrees fairly well with the result of personal enquiries and if the area of 33,000 acres be assumed to be correct, then the value of production of silk from the State for 1910-11 would be about Rs. 87,45,000. The local merchants estimate the value at about 80 to 100 lakhs of rupees.

Average annual export of silk.

The average value of export of silk from the State during the decade ended 1910-11 was 35 lakhs of rupees and the balance worth about 53 lakhs of rupees must have been consumed by the handlooms of the State using silk.

Some of the Bangalore silk looms consume an average of 4 lbs. per month per loom or say 50 lbs. per year, of bleached and dyed silk, corresponding to nearly 62 of *Kora* or about 500 rupees worth a year, and the number of such handlooms in the State that could consume this quantity should be over 10,000. But no definite information is available on this point, and many of the looms use silk and cotton together.

Some estimate of local consumption of silk.

Mysore trade in *textiles* proper is one of expansion. The average value of exports of articles of clothing and of raw materials increased by 80 per cent in the course of the two decades 1890-91 to 1910-11 and that of imports by 28 per cent. The large increase in exports is due to the steady expansion of the export trade in raw cotton and in raw silk, while the rise in imports is due to increased demand for cotton manufactured articles.

Trade in textiles.

Advancing prices of cotton during the decade stimulated greater production and the area under cotton accordingly expanded from an annual average of 60,000 acres in the first five years of the decade to that of 75,000 in the second (Table X.) The yield of cotton crop has likewise been steadily on the increase from an annual average of 1·19 Bengal maunds per acre during the first five years to 1·54 Bengal maunds in the second. This was probably due to increased attention based on the hope of enhanced returns. Consequent on the combined effect of these two factors, the quinquennial average value of cotton crop per acre increased by about 40 per cent, from Rs. 25·4 to Rs. 35·6, during the decade. The average annual totals of the production of cotton in the two parts of the decade were 74,000 and 1,04,000 Bengal maunds (lint) valued at 15·24 and 26·7 lakhs of rupees respectively.

Production of cotton raw.

The above values of yield work to 4 annas 4 pies and 7 annas 4 pies per head of population respectively.

Per head.

The two mills in Bangalore are the greatest consumers of cotton raw, a small but inestimable quantity being used up by the people for mattresses, pillows, etc. About 32,000 Bengal maunds of lint were being absorbed annually by the two mills in the first five years of the decade ending with 1910-11 and 49,000 in the second, producing 23,600 and 41,000 Bengal maunds of cotton yarn respectively.

Consumption of cotton by the mills and production of yarn.

The consumption of yarn by the handlooms in the State is found to be 51,000 and 52,000 Bengal maunds respectively for the two halves of the decade and this shows that the work of the handloom weaver has been practically steady.

Consumption of yarn by the handlooms in the State.

Production and consumption of cloth are shown in Table XI. It is seen therefrom that the quantity of consumption of cloth in the Mysore State is almost equally supplied by the three main suppliers, *viz.*, the Indian Mills, the European Mills and handlooms, or the mill made cloth constitutes roughly about $\frac{2}{3}$rds of the consumption and the handmade only $\frac{1}{3}$rd.

Production and consumption of cloth.

The quantity per head of population was 2·13 lbs. in the first five years of the decade 1901-02 to 1910-11 and 2·21 lbs. in the second, showing thereby that the needs of the Mysore people for cotton cloth increased by nearly 4 per cent during the decade.

As regards wool raw, the quantity of production is all important, the trade therein being comparatively small. The 23 lakhs of sheep in 1901-02 would have yielded 29 lakhs of lbs. of raw wool at $1\frac{1}{4}$ lbs. per sheep per year and the increased number of 27 lakhs in 1910-11 to 34 lakhs of lbs. at the same rate (Table XII).

Production of wool.

The import of wool has been constant at 5,000 Bengal maunds or 4·1 lakhs of lbs. throughout the ten years, while there was no export in the first five years and that in the second was only 1,000 Bengal maunds.

Trade in wool.

Consumption of wool. The consumption of wool by the mills and handlooms together was 34·1 and 37·3 lakhs of lbs. respectively in the two periods. This quantity was shared in the ratio of 3 parts in favour of handlooms and only one by the Binny Woollen Mills.

Value of Production of certain Articles—A Rough Estimate.

Hides and skins. The value of production of hides and skins, as estimated in the chapter on "Trade" is about 75 lakhs of rupees.

Coffee. The average value of production of coffee for the two halves of the decade ending with 1910-11 is found to be 54 and 50 lakhs of rupees respectively.

Oil seeds. According to figures given in the "Area and yield of certain principal crops in India," the production of oil seeds from an acre is about 4 to 5 Bengal maunds and this, at Rs. 5 per maund will give a money value of at least Rs. 20 per acre for oil seeds and the total value for the 2·8 lakhs of acres would be about 56 lakhs of rupees.

Cocoanut. At Rs. 100 per acre, the 66,000 acres solely under cocoanut would give about 66 lakhs of rupees for the total value of production of that nut and the actual value is likely to be more, since there is some more area under cocoanut and areca-nut, together.

Arecanut. At 20 maunds of areca-nut per acre valued at about Rs. 150, the value of the total production of this nut will be at least 40 lakhs of rupees from the 27,000 acres under areca and this does not include the value of the areca grown along with cocoanut.

Condiments. The 1·33 lakhs of acres under condiments and spices will represent a value of at least 15 lakhs of rupees.

Ghee. Some idea of the value of ghee produced in the State can be formed by supposing 25 per cent of the 20 lakhs of cows or 5 lakhs of them to be yielding throughout, at about 1 lb. of milk per day, over and above what is consumed as milk and assuming that the yield of ghee is $\frac{1}{20}$ths or 5 per cent of the weight of milk, the total yield per cow per year will be about $\frac{3}{4}$ths of a local maund worth about Rs. 12 at least and for the 5 lakhs of cows the total value will be 60 lakhs of rupees.

Total value of production of certain articles. The total value of production of food grains, provisions, spices, silk, cotton, wool, hides and skins and oil seeds, etc., as set forth above will mean an average of nearly Rs. 24 per head of population.

Items not included. This is only a very rough estimate and it does not include the value of gold and manganese produced, of forest products like timber, sandalwood and fuel and of the production of arrack, etc., from the Government distillery. Earnings from manufactures are also not taken into account.

If the total average income of the population of the State is to be computed, several other items are to be included.

The earnings of the artisans and others must be taken into account besides the income from manufactures, trade and the various other professions and transactions.

This task is beyond the scope of the present work and I would now pass on to the consideration of the more important question of the possibilities of increasing the aggregate value of production of raw materials by adopting improved agricultural or horticultural operations.

A source of increase of wealth. The Kannambadi reservoir is likely to increase the area under wet cultivation by 25,000 acres and the value of production by 40 lakhs of rupees. If the dam of the reservoir be raised to the full height projected, about 1½ lakhs of acres would be brought under rice and sugarcane, and even if all the land be utilised

for paddy cultivation alone, a very large increase, up to 90 lakhs of rupees could be added to the present income of the ryot population.

There would then be no import of rice from outside but an export trade could be set up. There would, besides, be considerable room for establishing rice mills. Colonisation by enterprising capitalists under large reservoirs like the Marikanave and Borankanave and in the *malnad* would further enhance the quantity and value of agricultural production.

Some Horticultural and other Possibilities in the Rural Parts :— A Suggestion.

Flower farms.

In addition to the possibilities of increasing the production by agricultural operations, some attention might be bestowed on introducing and developing horticultural activities in the rural parts. As detailed in the chapter on oils and oil-seeds, it may be observed that flower farms in France yield incomes varying from Rs. 300 to 450 per acre and even more. Such flower farming would be at least as good as growing sugar cane, with the additional advantage of continuous yield for seven or eight years, without the heavy recurring cultivation expenses necessary in the case of the cane.

Area not to exceed one gunta. Possible income.

Large areas under such farms are not contemplated for general introduction among the ryot population. Even one *gunta* would be large enough for each family and would yield up to Rs. 12 per annum. This figure shows merely the possibilities.

Steps to be taken.

Several conditions have to be fulfilled before an income could be realised. First of all, the ryots have to be convinced as to the profitable character of the venture. Attempts in this direction might be made by Government or co-operative agencies establishing small flower farms in the district headquarters or other convenient centres in each district and also stills or other appliances to extract the essence, with the help of the Indian Institute of Science. Opinion of the consumers in Europe and America might then be obtained as to the nature, market value and extent of demand for such essences. If favourable, the ryots will have to be convinced by lectures and demonstrations; seeds, seedlings or cuttings of such plants will have to be supplied and several stills or pomade plants established by the better informed among them at taluk headquarters or *hoblies;* and finally the industry and trade should be well organised and encouraged.

Areas favourable.

All parts of the State are not suited for such flower farming. The *malnad*, and the areas around the waterspread of the chief reservoirs and large tanks in the State would be convenient centres to start with, as well as along river banks.

Vegetable butter in place of lard.

If lard, animal fat, be objectionable for the preparation of pomades, a substitute is available in the form of vegetable butter from the seeds of certain trees growing in the ghat forests such as *Dhoopadamara*, Vateria indica; Garcinia pictora, the Mysore gamboje tree; Garcinia purpurea, or kokum butter tree and others.

Fruit growing.

Growing of fruit plants might also be introduced as a rural industry. If each ryot grows a couple of valuable fruit trees in the backyard of his cottage or even one, the total number in each village would be respectable.

Industry of preserved fruits.

Preparation of fruit preserves would then become possible and the industry might be organised as a rural one by the small capitalists. Even if each tree yields an income of Rs. 3 per year, a substantial addition will have been made to

the resources of the ryot, in such of the areas which are favourably situated for fruit culture.

Vegetable farms and desciccated vegetable.

If vegetable farms be organised in rural parts, to supply desciccated vegetables to the European and Indian markets, the value of production per acre will be much more than from ordinary agriculture. All these points require detailed enquiry.

Dairy farming.

Dairy farming at localities like the region around the water-spread of the Marikanave and Borankanave reservoirs; between Harihar and Honnali and also near Mandya and Nanjangud would also help to increase the income of the ryot.

Some localities specially favourable.

The first two localities are specially favourable for Dairy Farming owing to the advantage of the combined occurrence of extensive grazing grounds in the hill ranges close by, of the large and permanent supply of water and of the existence of the *gollar* population, especially near Marikanave.

Lucerne and *agase* to be grown.

Good fodder crops like lucerne can be grown over large areas with the help of the permanent water supply; or *agase* Agati grandiflora, a quick growing plant, might be grown, the leaves of which are reputed to increase the milk supply in cows. The leaves also serve as excellent manure. The wood can be utilised for fuel or other purposes.

***Agase* plantations for villages and Dairy farms.**

Such *agase* plantations might be advantageously introduced into the villages in general, to supply the ryot with fodder, fuel and manure and bring about an increase in his income.

A small capitalist can own such farms, get his supply of milk from the *gollars* and provide them with cattle fodder. He need not purchase the cows.

Cattle breeding to be organised.

Cattle breeding as a profession is reported to be popular in certain parts of the State as in the Gubbi taluk, and organised attempts should be made to improve the draught power of bullocks and the milk supply of cows.

Also improving the breed of sheep.

Improvement of the breed of sheep will also help to enhance the yield from the sale of the wool and thus add to the income of the ryot. Efforts made by the Amrut Mahal Department might be redoubled till the object is secured.

Ostrich farming.

Ostrich Farming is reported to be introduced in Baroda and this point might be enquired into. Cultivation of lucerne over large areas, one of the conditions necessary for Ostrich Farming is quite feasible in several parts of the State and capitalists would readily take up the industry if full and reliable data be available and facilities be afforded towards getting good Ostriches.

Sir George Watt, in his Commercial Products of India says that mention was made of Mysore as a favourable locality. The great success of the Australian Farms for Ostrichs support the suggestion.

Agricultural and Industrial Possibilities of the Malnad.

Capital and machinery required for high cultivation.

The possibilities of the Mysore *malnad* are immense, both for agriculture and industries. High and intensive cultivation is possible, only when decent capital is applied to land and also manual labour is replaced by machinery.

Joint family system, a stumbling block.

The joint family system in vogue in India for thousands of years has resulted in the land being split up into a great number of small individual holdings, with consequent and multifarious disadvantages. This is one of the greatest stumbling blocks to any application of capital and machinery to agriculture.

Steps being taken.

These defects could certainly be remedied whenever land is taken up a new for cultivation. Some of the areas in the Western Division of the State, if parcelled out into decent sized blocks and assigned to individuals, who have the means, capacity and necessary enterprise, would favour high cultivation as is practiced in America and in other parts of the world and steps are being taken by the Agricultural Committee of the Economic Conference and by the Agricultural Department to bring about this desired improvement.

The malnad offers exceptional facilities; land, water, fuel and power.

The *malnad* offers exceptional facilities for such high cultivation. Nature has favoured the region with heavy rain fall. Water required for the dry season can be easily stored in a number of tanks more extensively than now. We have practically inexhaustible supplies of fire-wood in the forests and it can be had at very small cost of about Rs. 2 per ton.* Possibly also, the cartage of fire wood in bulk might be saved by converting wood into charcoal by destructive distillation in one or two convenient centres. Thus either the charcoal might be carted as such or in bricquettes; or electric power developed at the site by consuming wood or charcoal might be transmitted and utilised.

Cultivation of sugarcane on a large scale would become possible and, as cheap fuel is available in sufficient quantities, introduction of machinery to manufacture sugar direct from cane would become practicable. The only point that would be left would be to enhance the productive capacity of the land and of the high sugar content of the cane. The central system for sugar manufacture would be easy of fulfilment, if the yield of cane and juice per acre be at least equivalent to what obtains in Cuba, Mauritius, etc.

Starting of industrial concerns utilising raw materials from forest would be very much facilitated by such supplies of power in the various forms suggested above.

Labour.

The very fact of labour being very scarce in the *malnad*, besides being inefficient will act as a potent reason for the introduction of machinery and no person will be dislodged from his ancestral occupation. On the other hand the few labourers available would come in handy for the future factories.

Capital. Reliable and useful information required.

The rich sowcars of *malnad* will be able to finance if they learn of new remunerative fields. What is required now is the supply of reliable and workable schemes which would convince them of the possibilities of utilising their surplus cash either in the direction of high cultivation and intensive farming or in other industrial operations utilising the fresh resources.

Forest revenue is likely to be enhanced and not reduced.

The Forest Department would not lose its present income. The full money value of the various forest resources is not being realised now, chiefly owing to paucity of forest industries and secondly to want of facilities of transport. If people can only be settled down at convenient centres here and there in the *malnad* and if they could have the facilities of transport to the nearest railways, then the reduction in the area under forests and of any possible reduction in revenue under that head would be practically nil compared to the likely increase due to larger quantities of raw materials being utilised with correspondingly higher values realised therefrom.

To sum up, there are great possibilities awaiting to be developed in the *malnad*, both agricultural and industrial. There is abundant rain fall and there are great facilities for storing up water for use in the dry season. Scarcity of labour is just the reason for introduction of machinery. Fuel is abundant and cheap, which is a very great advantage in favour. Money is also available and is awaiting to be set

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* At the Forest site.

free on the diffusion of useful information as to the existence of several remunerative fields. Government would also gain by enhanced revenues. What is required to be done first is merely the diffusion of reliable commercial information relating to the various possible lines of investment, agricultural or industrial.

Opening up of the *malnad*.

The immediate opening up of the *malnad* might be effected by organising a motor service which would also improve the sanitary condition of towns and villages. Personal preaching is absolutely essential if any results are to be expected in the very near future. With this motor service, telegraphic communication and a motor hospital to any important point, any enterprising capitalist would be encouraged to colonise there.

Two lines of railway starting from Shimoga, one to Sagar and Gersoppa and another to Thirthahalli and Agumbe would be very effective in developing the resources of the Shimoga and parts of the Kadur districts. The southern part of the Kadur district would benefit by the projected Arsikere-Mangalore line.

TABLE I (*c*).

Shows the average annual values, in lakhs of rupees, of the Mysore railborne transfrontier traffic in the chief food grains, during the two decades 1890-91 to 1899-00 and 1901-02 to 1910-11.

Name of article	Imports		Exports		Remarks
	1st Decade 1890-91 to 1899-1900	2nd Decade 1901-02 to 1910-11	1st Decade 1890-91 to 1899-1900	2nd Decade 1901-02 to 1910-11	
Ragi	·73	1·3	28·7	11·8	
Paddy	·40	·32	5·05	6·4	
Rice	17·50	34·8	·73	·5	
Cholam	·14	1·04	12·36	6·39	
Gram and Pulse ...	4·25	8·2	5·28	3·98	
Wheat	3·00	3·04	·12	·002	
Total of all grains ...	26·02	48·7	53·1	29·0	

Graph showing the variations in the areas under Rice in the eight districts of the Mysore State from 1895-6 to 1909-1910.

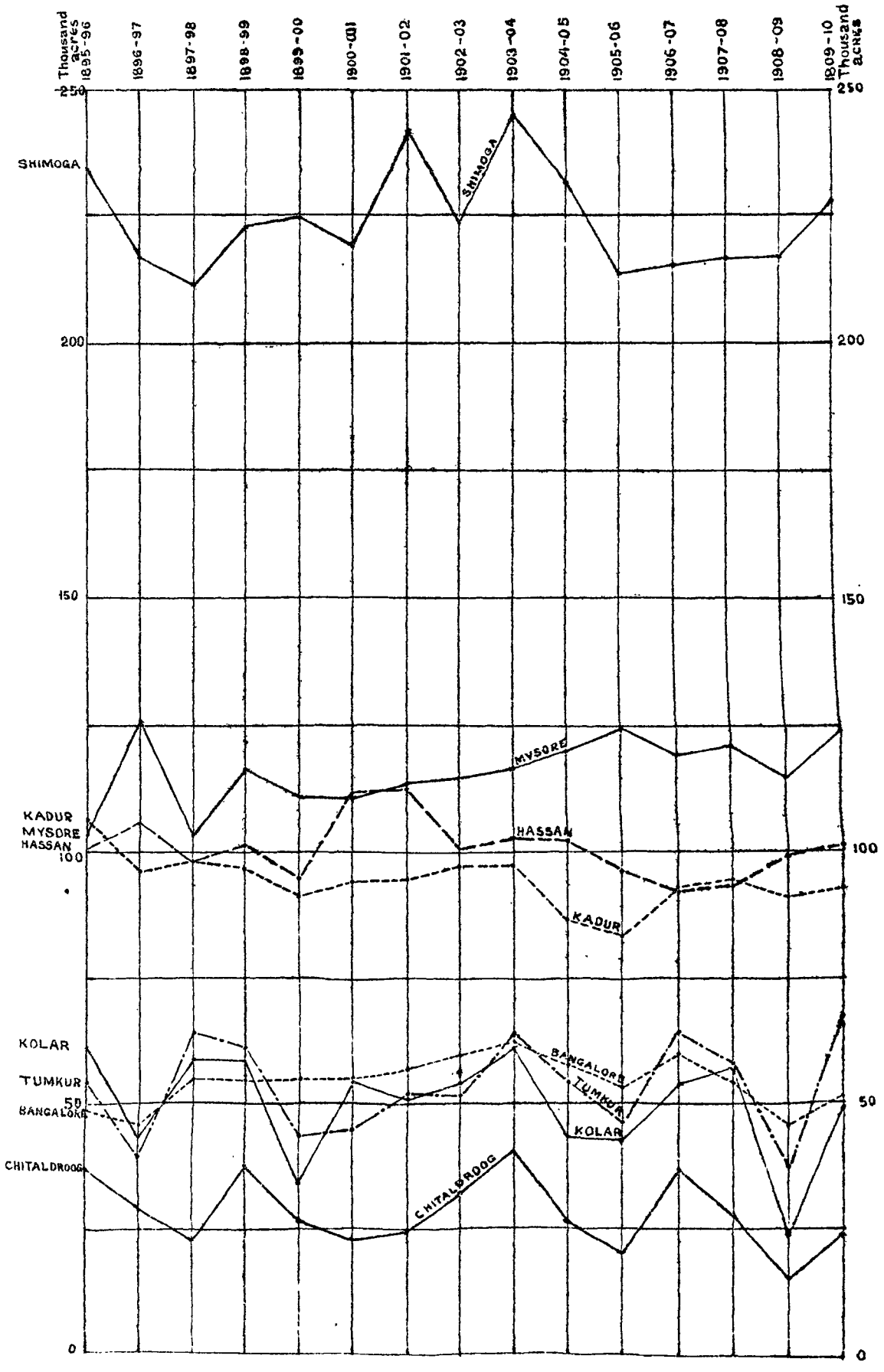


TABLE II.

Showing the quantities of production and quantities and values of consumption of paddy in the Mysore State during the 14 years, 1897-98 to 1910-11.

0·40 of a *Khandy* is the average rate of production per acre per anna crop (1 *Khandy* of paddy=4 Bengal maunds).

Year	Area under paddy in lakhs of acres	Outturn in annas in the rupee	Estimated actual outturn: Khandies	Estimated actual outturn: B. Mds.	Exports	Imports	Balance Consumption Store and Traffic by road including paddy-equivalent of net import of Rice	Average price in the period	Total value of Consumption	Average Population during the period in lakhs	Consumption per head: Quantity in seers of 2 lbs. each	Consumption per head: Value in rupees	Remarks
1897-98 ...	7·15	10·5	27·15	109·80	1·59	·01	...	20 seers of paddy per rupee or Rs. 2 per B. Md.	236·4	54	180 lbs or 90 seers.	4·4	Production is nearly 4 *Khandies* per acre, value Rs. 32 per acre. Import ⅛ of production or 11 per cent nearly.
1898 99 ...	7·54	10·4			2·37	·19	...						
1899-00 ...	6·83	7·6			1·20	·14	108·19						
1900-01 ...	7·15	9·8			...	...	10·0						
	7·17	9·57			1·72	·11	118·19						
1901-02 ...	7·49	10·8	...		·39	·11	...	20·72 seers per rupee or 41 lbs or Rs. 2 per B. Md. nearly	245·26	56	90 seers.	4·4	Import of rice (converting into paddy) was ⅛ or 11 per cent of production.
1902-03 ...	7·38	10·2	27·95		1·49	...	...						
1903-04 ...	7·92	10·5	...	111·80	1·76	·10	...						
1904-05 ...	7·27	8·2	22·15		2·75	·24	12·2						
1905-06 ...	6·83	7·9	21·14		1·12	·07	110·43						
	7·38	9·5			1.50	·13	122·63						
1906-07 ...	7·36	10·0	28·61		1·53	...	...	16·34 seers Rs. 2½ per B, Md.	316	58	89·40	5.4	Import of rice converted into paddy was ¼ or 14 per cent of production.
1907-08 ...	7·24	9·8	27·67		6·49	...	...						
1908-09 ...	6·48	7·8	19·51	113·04	3·29	·34	...						
1909-10 ...	7·41	11·6	33·79		1·11	·23	16·5						
1910-11 ...	7·91	10·2	31·73		3·81	·04	110·0						
	7·28	9·88	28·26		3·24	·20	126·5						

Trade in Rice—Average for the three periods.

		Export.	Import.
1st	...	0·23	5·76
2nd	...	·13	6· 9
3rd	...	·13	9· 3

Paddy equivalent of Net Import of rice.

5·54 × 1·8 = 9·972 or 10·0 in round numbers.
6·77 × 1·8 = 12·2 or 12·2 Do
9·17 × 1·8 = 16·506 or 16·5 Do

N.B.—Quantities are in lakhs of Bengal maunds or Khandies and values in lakhs of rupees, except where otherwise stated.

TABLE III.

Showing the quantities of production and quantities and values of consumption of *ragi* in the Mysore State during the 14 years 1897-98 to 1910-11.

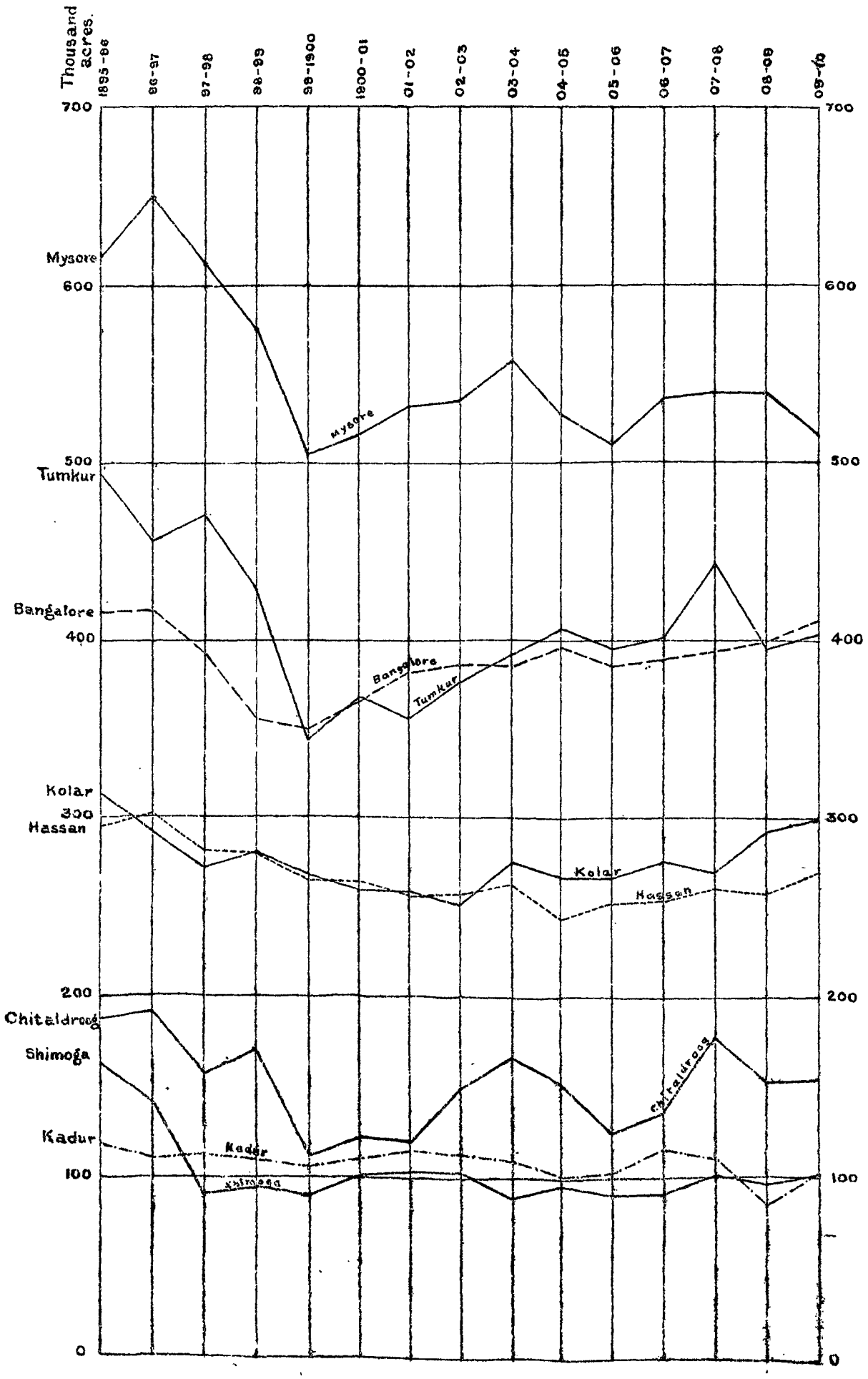
1 *Khandy* of 160 measuring seers of ragi weighs about 4 Bengal Maunds.

·2 of a *Khandy* is the average rate of production of ragi per acre per anna crop.

Year	Area under crop in lakhs of acres	Outturn in annas in the rupee	Estimated actual outturn		Export B. mds.	Import B. mds.	Balance Consumption Store and Traffic by road B. Mds.	Average price during the period	Total value of Consumption	Average Population during the period in lakhs	Consumption per head		Remarks
			Khandies	Bengal Maunds							Quantity seers	Value in rupees	
1897-98 ...	23·91	8·4			23·23	·19	120·50	22·25 seers per rupee (44·5 lbs.) or Rs. 1·9 per B. md.	229·0	54·0	90 seers in round figures	A little over Rs. 4.	Production 1½ khandies per acre or 240 seers. Export is $\frac{1}{14}$th of production.
1898-99 ...	22·94	8·6			8·79	·48							
1899-00 ...	20·40	5·3			3·68	·54							
1900-01 ...	21·07	7·5	33·00	132·0	11·90	·40							
	22·08	7·45											
1901-02 ...	21·25	9·2	...	...	3·95	·53	127·91	24·4 seers per rupee (Rs. 1·7 per B. md.)	217·0	56·0	94 seers.	Slightly less than Rs. 4.	Export is $\frac{1}{24}$th of production; average production per acre = 243 seers.
1902-03 ...	21·69	8·9	33·0	132·0	2·87	·57							
1903-04 ...	22·39	9·2	...	...	4·21	·38							
1904-05 ...	21·93	5·0	23·33	...	6·89	·17							
1905-06 ...	21·27	6·0	25·87	...	9·34	·18							
	21·70	7·66	...	...	5·45	·36							
1906-07 ...	22·00	9·1	41·08	...	5·77	·19	140·49	15·52 seers per rupee or Rs. 2·6 per B. md.	364	58·0	99·31 seers.	Rs. 6·38	Average production per acre = 258 seers; exports $\frac{1}{25}$th of production.
1907-08 ...	22·94	7·4	33·99	...	5·05	1·36							
1908-09 ...	22·17	5·1	23·14	...	4·42	1·36							
1909-10 ...	22·59	9·6	44·60	...	1·17								
1910-11 ...	22·89	9·5	44·46	...	3·38	·10							
	22·51	8·0	36·0	144·00	4·14	·63							

Quantities are in lakhs of Khandies or Bengal maunds and value in lakhs of rupees, unless otherwise stated.

Graph showing the variations in the areas under Ragi in the eight districts of the Mysore State from 1895-6 to 1909-1910.



Graph showing the variations in the areas under Cholum in the eight districts of the Mysore State from 1895-6 to 1909-1910.

No graph is drawn for the Bangalore district as the areas under Cholum are comparatively insignificant.

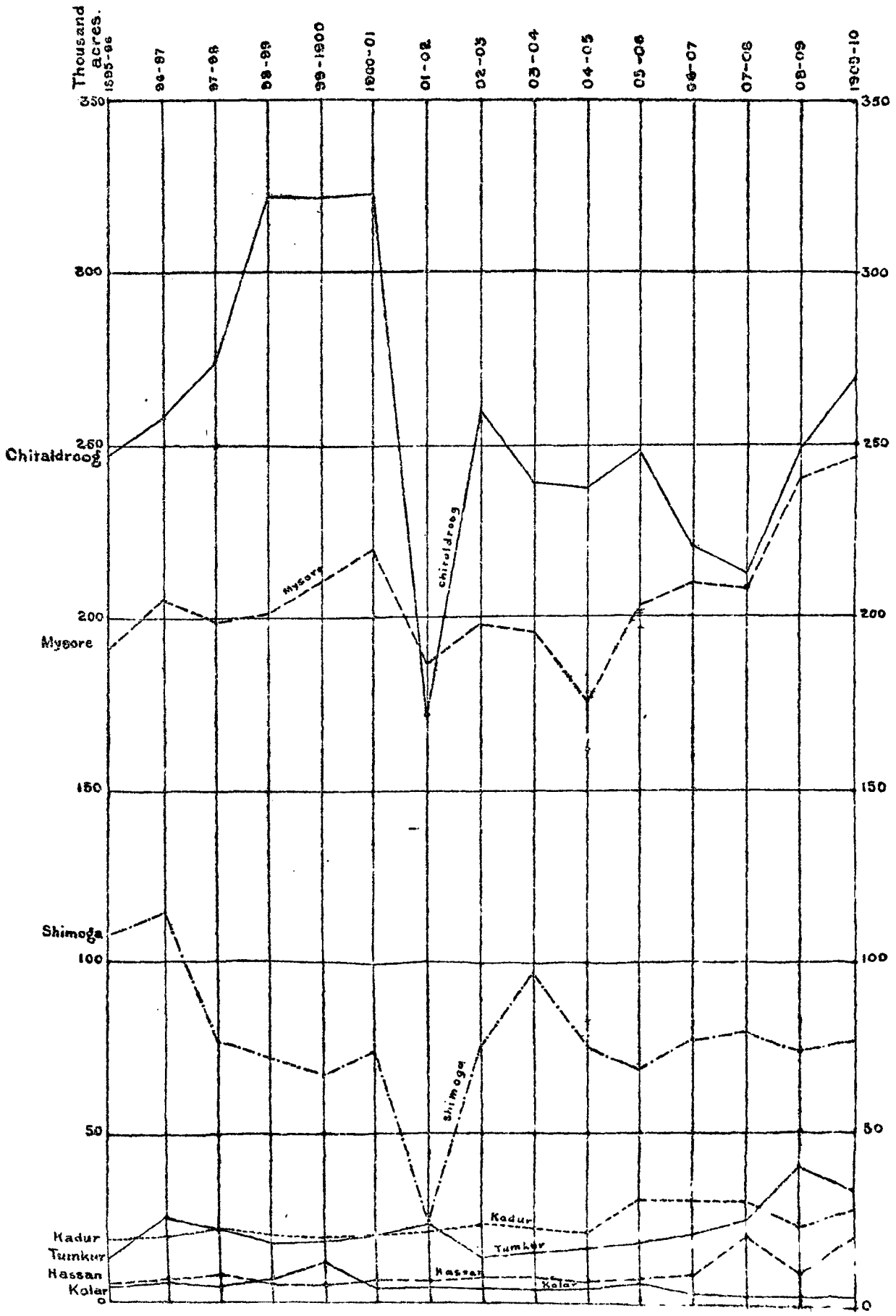


TABLE IV.

Showing the quantities of production and quantities and values of consumption of *cholam*, *etc.*, in the Mysore State during the 14 years, 1897-98 to 1910-11.

·15 of a *Khandy* is the average rate of production per acre per anna crop. (1 *Khandy* = 4 Bengal maunds).

Year	Area under crop in lakhs of acres	Outturn in annas in the rupee	Estimated actual outturn		Export B. Mds.	Import B. Mds.	Balance Consumption Store and Traffic by road B. Mds.	Average price in seers per rupee	Total value of consumption	Average Population	Consumption per head		Remarks	
			Khandies	B. Mds.							Quantity B. Mds. and seers	Value in rupees		
1897-98 ...	6·09	10.0	*8·28*	*33·12*	7·58	·34	...	19·05 or Rs. 2·16 per B. md.	72·83	54·	·62	1·33	Quantities added for Bazra at $\frac{1}{6}$ of the production of *cholam*. 5·52 lakhs.	
1898-99 ...	6·53	9·9			2·29	·02	28·21							
1899-00 ...	6·58	6·1			5·35	·13	5·52				25·6 seers.			
1900-01 ...	6·75	8·0			...	...	...							
	6·50	8·5			5·07	·16	33·73							
1901-02 ...	4·44	8·5	...		3·92	·004	22·38	21·26 or 42·5 lbs. Re. 1·9 per B. md.	50·00	56·	·47 or 19·42 seers.	·9 or Re. 0-14-6.	Do	4·15.
1902-03 ...	5·85	8·2	...		2·77	...	4·15							
1903-04 ...	5·83	8·9	*6·25*	*24·92*	·65	...								
1904-05 ...	5·06	6·9	5·30		1·45	...	26·53							
1905-06 ...	5·67	6·0	5·15		4·14	·04								
	5·40	7·7			2·58									
1906-07 ...	5·75	7·7	6·64		1·41	·07	28·32	13·09 or Rs. 3·13 per B. md.	103·94	58·	·57 or 23·47 seers.	1·79 or Rs. 1-12-8	Do	4·89.
1907-08 ...	5·80	7·7	6·82		2·17	·05	4·89							
1908-09 ...	6·40	5·0	4·91	...	2·69	1·05								
1909-10 ...	6·83	10·0	10·43		·67	1·82	33·21							
1910-11 ...	6·19	9·2	8·63		1·26	·10								
	6·20	7·9	*7·4*	*29·36*	1·64	·60								

Quantities are in lakhs of *Khandies* or Bengal maunds and values in lakhs of rupees, unless otherwise stated.

TABLE V.

Showing the average quantities of production and quantities and value of consumption of *Horse-gram* in the Mysore State for the 14 years, 1897-98 to 1910-11.

0·10 of a *Khandy* is the average rate of production of *horse-gram* per acre per anna crop.

One *Khandy* of *horse-gram* = 5 Bengal maunds nearly.

Year	Area under crop in lakhs of acres	Outturn in annas in the rupee	Estimated actual outturn		Exports B. Mds.	Imports B. Mds.	Balance Consumption Store and Traffic by road B. Mds.	Average price in seers per rupee	Total value of consumption	Average Population	Consumption per head		Remarks
			Khandies	B. Mds.							Quantity B. Md. and seers	Value in rupees	
1897-98 ...	6·46	5·9	*1·62*	23·10	2·75	2·37	23·03	9·20 or Rs. 3·55 per B. md.	81·75	53·90 or 54·0.	·43 or 14·1 seers.	A little over Re. 1-8-0.	
1898-99 ...	7·78	7·8			·68	2·03							
1899-00 ...	8·34	4·9			2·5	1·3							
1900-01 ...	8·03	5·6			...	...							
	7·65	6·5			1·97	1·90							
1901-02 ...	8·11	8·6	*3·25*	26·25	·36	2·93	27·73	10·0 or Rs. 3·28. per B. Mds.	90·96	56·28 or 56	·50 or 16·4 seers.	Re. 1·62.	The areas under horse-gram are taken from the tables of Agricultural Statistics *at the end* of each annual publication from 1904-05 onwards.
1902-03 ...	8·04	7·9			2·14	1·31							
1903-04 ...	8·40	8·5			·72	2·30							
1904-05 ...	...	4·1	2·37		·24	3·15							
1905-06 ...	5·91	5·8	3·37		·93	2·07							
	6·9	6·9			·87	2·35							
1906-07 ...	6·08	6·6	4·09	18·3	·72	1·63	19·31	8·32 or Rs. 3·94 per B. md.	76·08	58·04 or 58	·33 or 10·8 seers.	Re. 1·31.	
1907-08 ...	5·94	7·1	4·25		1·67	1·86							
1908-09 ...	5·45	3·7	1·06		1·22	2·42							
1909-10 ...	5·81	7·6	4·34		1·13	3·43							
1910-11 ...	6·72	8·0	5·32		1·94	2·57							
	6·05	6·6	*3·99*		1·37	2·38							

Quantities are expressed in lakhs of *Khandies* or of Bengal Maunds and values in lakhs of rupees, unless otherwise stated.

TABLE VI.

Showing the average estimated quantities and values of consumption of other Food Grains including Pulses for the 14 years 1897-98 to 1910-11.

Year	Area under crop in lakhs of acres	Outturn in annas in the rupee	Estimated actual outturn*		(a) Exports	(a) Imports	Balance Consumption Store and Traffic by road	(b) Average price in seers per rupee	Total value of consumption	Average Population in lakhs	Consumption per head		Remarks
			Khandies	B. Mds.							Quantity B. mds. and seers	Value in rupees	
1897-98 ...	6·6												
1898-99 ...	6·68												
1899-00 ...	7·13	7·45	...	21·08	...	...	21·08	22·25 or Re. 1·9 per B. md.	40·0	54·	·39 or 16 seers.	Re. 0-11-6.	At 22·25 seers per rupee.
1900-01 ...	7·9												
	7·08												
1901-02 ...	9·70												
1902-03 ...	9·27												
1903-04 ...	8·70	7·66	...	27·00	...	...	27·00	24·4 seers per rupee or Re. 1·7 per B. md.	45·9	56·	·48 or 19·76 seers.	About Re. 0-13-0.	At 24·4 seers per rupee.
1904-05 ...	8·57												
1905-06 ...	7·85												
	8·82												
1906-07 ...	8·84												
1907-08 ...	8·17												
1908-09 ...	8·0	8·0	...	26·80	...	...	26·80	15·52 seers or Rs. 2·6 per B. md.	69·7	58·	·46 or 18·86 seers.	Re. 1-3-2.	At 15·52 seers per rupee.
1909-10 ...	8·78												
1910-11 ...	8·51												
	8·41												

* On the assumption that production from the dry miscellaneous crops is only half that of Ragi.

(a) Already included under Ragi.

(b) Taken to be the same as for *ragi*.

Quantities are in lakhs of Bengal maunds and values in lakhs of rupees, unless otherwise stated.

TABLE VII.

Showing approximate quantities and values of food grains produced and consumed per head of population during the 14 years 1897-98 to 1910-11.

		Quantity in seers			Value		
		1st Period	2nd Period	3rd Period	1st Period	2nd Period	3rd Period
					Rs. a. p.	Rs. a. p.	Rs. a. p.
Paddy ...	P.	83·23	81·59	79·95	4 1 0	4 0 0	4 14 0
	C.	90·00	90·00	89·40	4 6 0	4 6 0	5 7 0
Ragi ...	P.	100·00	96·64	101·8	4 8 0	4 0 0	6 9 0
	C.	90·00	94·00	99·31	4 0 0	3 14 0	6 6 0
Cholum...	P.	25·10	18·24	20·74	1 5 0	0 13 7	1 9 4
	C.	25·60	19·42	23·47	1 5 5	0 14 6	1 12 8
Gram and Pulse ...	P.	14·00	15·35	10·13.	1 8 4	1 8 8	1 4 0
	C.	14·10	16·40	10·8	1 8 6	1 10 3	1 5 2
Others ...	P.	16·00	19·76	18·86	0 11 6	0 13 0	1 3 2
	C.	16·00	19·76	18·86	0 11 6	0 13 0	1 3 2
Total ...	P.	238·33	231·58	230·98	12 1 10	11 3 3	15 7 6
	C.	235·7	239·58	241·84	11 15 5	11 9 9	16 2 0

P. Means Production.
C. Means Consumption, including Store, etc.
1st period 1897-98 to 1900-01.
2nd period 1901-02 to 1905-06.
3rd period 1906-07 to 1910-11.

TABLE VIII.

Showing quantities of production and quantities and values of consumption of *Jaggery and Sugar* for the 14 years, 1897-98 to 1910-11.

1 Bengal maund = 3·4 local maunds of 24 lbs each.

8·5 local maunds is the production per acre per anna crop.

Year	Area under crop in acres	Outturn in annas in the rupee	Estimated actual outturn		Exports B. Mds.	Imports B. Mds.	Balance Consumption Store and Traffic by road B. Mds.	Average price per B. Md.	Total value of consumption of jaggery and *magadum* sugar, refined sugar not included	Population (in lakhs)	Consumption per head		Remarks
			Local maunds	B. Mds.							Quantity in lbs.	Value in rupees	
1897-98 ...	26,952	10·8	25·40	7·47	*(b)* *0·76*	*(b)* *0·33*	7·04	Rs. 6½	48·5	54	·13 B. Md. = 10·6 lbs per year.	Re. ·82	
1898-99 ...	29,315	10·4							− 4·1				
1899-00 ...	29,695	8·3											
1900-01 ...	41,155	8·0											
	31·8	9·4							44·4				
1901-02 ...	44,307	11·2	35·80	10·54	2·06 *(b) 0·38*	·10 *(b) 0·28*	8·48	Rs. 7	59·36 − 1·46	56	·15 B. Md. = 12·42 lbs. = 1·0 lb. per month.	Re. 1·03	Average consumption is ½ of a local maund per year per head.
1902-03 ...	45,210	10·9											
1903-04 ...	41,664	11·1											
1904-05 ...	37,914	8·4											
1905-06 ...	39,427	9·0							57·90				
	41·7	10·1											
1906-07 ...	40,373	9·2	(*a*) 32·97	9·70	2·27 *0·28*	·07 *(b) 0·86*	8·10 + ·38 production from Goribidnur factory	Rs. 7	48·5 + 4·31	58	·15 B. Md. = 1 lb. per month.		
1907-08 ...	44,550	9·0											
1908-09 ...	33,253	7·7											
1909-10 ...	34,969	11·4											
1910-11 ...	40,509	11·4							52·81				
	38·7	9·74											

N.B.—Imports and exports under *unrefined sugar* are taken into account and only exports under Jaggery, etc., since the imports consist almost entirely of palmyra, Jaggery and molasses as seen from the low prices.

(*a*) Average of quantities given in the Agricultural Statistics.

(*b*) Export and import figures under refined sugar.

Quantities are given in lakhs of Local and Bengal maunds and values in lakhs of rupees, unless otherwise stated.

TABLE IX.

Shows the Area under Mulberry Cultivation in Mysore in the year 1910-11.

Serial No.	Name of District	Area under cultivation A.	Area under cultivation G.	Remarks
1	Bangalore	3,924	39	
2	Kolar	3,123	29	
3	Tumkur	1,401	22	
4	Mysore	24,832	6	
	Provincial Total ...	33,282	16	

TABLE X. (*a*)

Showing the average quantities and values of production of cotton in the Mysore State during the two halves of the decade 1901-02 to 1910-11.

Year	Average Area under crop in acres	Estimated outturn per acre in B. Mds.	Estimated actual outturn: In lbs. of lint per acre	Estimated actual outturn: B. Mds.	Exports (B. Mds.	Imports (B. Mds.)	Balance consumption Store or Traffic by road	Average values of cotton crop per acre	Total value of production	Population	Production per head: Quantity	Production per head: Value	Remarks
1901-02 ... to 1905-06 ...	60,000	1·19*	97·58 lbs.	74,000	64,000	21,000	32,000	Rs. 25·4	15·24 lakhs of rupees.	56·	...	·27 of a rupee or 4·3 annas.	
1906-07 ... to 1910-11 ...	75,000	1·54*	126·28	104,000	85,000	30,000	49,000	Rs. 35·6	26·7 lakhs of rupees.	58·	...	·46 or 7·3 annas.	

Consumption of Twist and Yarn by the Handloom Weavers is ·51 and ·52 lakhs of Bengal maunds in the two halves of the decade 1901-02 to 1910-11.

* This figure is derived by dividing by five the sum of the five individual annual yields per acre and it differs slightly from that of the average yield per acre obtained by dividing the average yields 74,000 and 1,04,000 by the average areas 60,000 and 75,000 acres. These two figures are 1·23 and 1·40 respectively.

(*a*) Compiled mostly from Table VI, Cotton, "The External Trade of the Mysore State."

TABLE XI.

Showing the average quantities of production and consumption of Cloth in the Mysore State, during the two halves of the decade 1901-02 to 1910-11.

Year	Production			Import of piece-goods			Export of piece-goods			Consumption	Population	Consumption per head		Remarks
	From Mills (local)	From Hand-looms	Total	Indian	European	Total	Indian	European	Total			Quantity per head	Value	
1901-02 ... ... to 1905-06	4,500	51,000	55,500	52,000	40,000	92,000 2,000 94,000	2,200	...	2,200 1,000 3,200	146,300	56 lakhs.	·026 of a Bengal maund =2·13 lbs.	...	
1906-07 ... ... to 1910-11	9,900	52,000	61,900	54,000	43,000	97,000 3.000 100,000	4,000	...	4,000 1,100 5,100	156,800	58 lakhs.	·027 Bengal maund =2·21 lbs.	...	

Quantities are expressed in Bengal Maunds

TABLE XII (*a*).

Showing the average annual quantities of production of Wool Raw during the two halves of the decade 1901-02 to 1910-11.

1901-02 ... to 1905-06 ...	23 lakhs of sheep	Quantity of wool is $23 \times \frac{5}{4} = \frac{115}{4} = 29$ lakhs of lbs. nearly.	
1906-07 ... to 1910-11 ...	27 lakhs of sheep	Quantity of wool is $27 \times \frac{5}{4} = \frac{135}{4} = 34$ lakhs of lbs. nearly.	

N. B.—Each handloom consumes 424 lbs. per year or nearly 1½ local maunds per month. Consumption of wool by handlooms is 25·85 lakhs of lbs. and that by Mills 8·68 lakhs of lbs.

TABLE XII (*b*).

Showing the average production and consumption of Wool manufactured during the two halves of the decade 1901-02 to 1910-11.

Year	Production, Mills and Looms	Imports	Exports	Balance of consumption	Population	Quantity per head	Remarks
1901-02 ... to 1905-06 ...	·40	·003+·013	·06	·356	56	·521 lbs.	
1906-07 ... to 1910-11 ...	·45	·005+·02	·04	·435	58	·615 lbs.	

N.B.—Quantities are expressed in lakhs of Bengal Maunds.

CHAPTER II.

RESOURCES FROM FORESTS.

The economic aspects of the forest resources may be considered under the following heads:—

1. Sandalwood.
2. Teak and other timber for building and other purposes of general construction, such as, agricultural implements, carts, carriages and waggons, railway sleepers, and spinning machines; carving and artwood, including those for toys and musical instruments, combs, etc.
3. Woods suited for matches.
4. Woods suited for pencils.
5. Fibre yielding woods and plants including cocoanut, areca and other agricultural fibres.
6. Fuel woods.
7. Woods suited for destructive distillation.
8. Woods and bamboos suited for paper pulp.
9. Woods and plants, yielding tans and dyes.
10. Woods, plants and herbs for drugs and chemicals, including gums and resins.
11. Forest oil seeds and vegetable fats.
12. Miscellaneous uses—walking sticks, tubs, casks, packing cases, etc.

Valuable information under the several heads was supplied by the Conservator of Forests in Mysore and what is available in the standard publications "Indian Forest Utilisation" by Mr. R. S. Troup and Pearson's Commercial Guide to the Forest Economic Products of India has been utilised.

Woods suited for fuels and for destructive distillation are considered in the chapter on "Power Resources." Under the head of Fibre-yielding woods and plants is included some information regarding the fibres from the cocoanut and arecanut palms and from others.

Lists are given of plants and trees, the products from which are used either in dyeing or as drugs and chemicals. They include gums and resins.

Sandalwood.

It grows in all the districts of the Mysore State except Kolar and Chitaldrug, where it is found sparingly. The average yield per annum for the last five years has been 3,000 tons for the whole State, of which 2,350 tons represent the quantity utilized every year.

The quantity available is thus enough to support several sandal-oil distillation plants and the quantity required in the State for carving is insignificant.

As regards price, the average for the ten years ending with 1911-12 has been Rs. 534 per ton, the roots fetching from Rs. 646 to Rs. 677, while the price of wood varied from about Rs. 600 to Rs. 668. The dust from sawing sandalwood was valued at Rs. 315 per ton.

The wood was sold for record prices of over Rs. 1,000 per ton during 1912-13.

Table XIII showing the outturn of Sandalwood from Government Forests according to the latest available Administration Reports:—*

Province	Division	Outturn			Revenue
		C. ft.			Rs. a. p.
Madras Presidency ...	North Arcot	2,869			
	South do	852			
	North Salem	1,241			
	South do	825			87,126 0 0
	North Coimbatore	6,252			
	Niligiris	384			
	Total ...	12,424			
		Khandies.	mds.	lbs.	
Bombay Presidency...	South Kanara	34	0	26	
	Belgaum	50	10	25	
	Dharwar	98 and 127 trees.	4	2	24,649 5 4
	Bijapur	206 trees.			
	Total ...	333 trees, 182 knandies, 15 maunds and 25 lbs.			

The outturn from Coorg in 1907-08 was 8,100 cubic feet and the revenue Rs. 1,38,835. The outturn from Mysore in 1906-07 was 2,381 tons, the revenue under this head being Rs. 12,84,983. The average annual outturn of sandalwood for past years, for the whole of India is summarised below:—

Locality	Duration from which the average is calculated	Quantity	Revenue realised	Remarks
			Rs.	
Mysore ...	Ten years ending 1906-07 ...	3,354 tons gross, 2,129 tons prepared wood.	12,49,836	Average of 3 years ending 1906-07.
Coorg ...	Do ...	184 tons ...	1,15,759	Do
Madras ...	Three years average ending 1906-07.	168 tons ...	57,851	
Bombay ...	Do ...	224 tons ...	30,001	A large portion of this timber came from Nasik and Nagar district, the quality being extremely poor.
Travancore ...	....	11 tons ...	1,004	
Sasanur ...	....	11 tons ...	1,117	
Kolhapur ...	Three years average ending 1906-07.	15 tons ...	1,531	
Sangle ...	Do ...	10 tons ...	1,400	
Sandur ...	One year	4 tons ...	2,250	

* Pearson's "Commercial Guide to the Forest Economic Products of India."

The average annual quantities of Sandalwood exported from India during 1905-06 and 1906-07 were as follows:— *

Locality	Quantity	Value
	Tons.	Rs.
Madras Presidency	1,517·5	9,69,084
Bombay Presidency	152·5	83,534
Bengal Presidency	132·5	70,039

The prices of this timber vary, being from Rs. 8 to Rs. 15 per cubic foot for billets, Rs. 7 to Rs. 11 per cubic foot for root-wood, from Rs. 30 to Rs. 350 per ton for chips, and Rs. 400 to Rs. 500 per ton for sawdust."

* Extracted from "The Commercial Guide to the Forest Economic Products of India."

For uses of Sandalwood, see Part II.

Timber.

Teak grows luxuriantly in the districts of Mysore, Shimoga and Kadur.

Teak. About 3,50,000 cubic feet of Mysore teak is available every year of which the average annual quantity sold is about 3,00,000 cubic feet, at a price varying from annas 8 to Rs. 1-4-0 per cubic foot.

The total average annual income from the teak grown in the State would thus be about 3 lakhs of rupees.

Other timbers. Some of the other valuable timbers are:—*Beete* (*Dalbergia Latifolia*) *Honne* (*Pterocarpus Marsupium*) *Mathi* (*Teminalia Tomentosa*) and *Bilvara* (*Albizzia Odoratissima*. Of these, *Mathi* grows to the greatest abundance in the State. It is used for building purposes and carriage manufacture. The average annual production of this timber is about a lakh of cubic feet, priced at about annas 5 per cubic foot. Almost the whole production of *Honne, i.e.,* to the extent of about 25,000 cubic feet per annum is used for building purposes and is rated at annas 8 per cubic foot.

Quantities and prices.

Beete is used chiefly for furniture making and is sold at annas 12 to Rs. 1-8-0 per cubic foot.

Nandi (*Lagerstræmia Lanceolata*) and *Jambe* (*Xylia Dolabriformis*) are found in the Kadur and Shimoga districts, as well as *Kiralbhogi, Hopea parviflora*, which is used for building and railways. About 10,000 cubic feet, which represents half the quantity available of this timber is utilized every year at annas 8 per cubic foot.

Agricultural implements. In Mysore, as in other parts of India, agricultural implements are, almost all of them, made of wood. The following kinds are usually used. *Dindiga* or *Annogesus latifolia*; *Jali* or *Acacia arabica*; *Kagli* or *Acacia catechu*; *Bilijali*, or *Acacia Leucopholia*; *Kendala-Sclieghira trijuga*; *Teak, Tectona grandis*; *Honne, Pterocarpus marsupium*; *Kakke, Cassia fistula*; *Kamara* or *Hdrdwickia binata*; and several others.

Sandalwood, *Hale, Eige* and others constitute the more important woods suited for art work and an account of the use of these is given in Part II.

Wood for stringed musical instruments.

Wood for stringed musical instruments should be uniform in structure and free from any knots or other flaws which will injure the tones. For some of the musical instruments the following woods are used, namely, *Teak*; *Halasu, Artocarpus integrifolia*; *Gandagarige* or *Cedrella toona*; *Honne-Pterocarpus marsupium*; *Godda, Odina wadier*; *Buruga, Bombax malabaricum*; *Yettega, Adina cardifoli*: *Ippe Bassia longifolia.*

Wood for combs.

Wooden combs are prepared in parts of the Tumkur District, the wood used being fine, even grained, of close texture and free from defects. The following woods are found suitable for the purpose, namely *Yettiga, Arasentega, Adina Cardifolia*; *Kadagala, Stephegyne parvifolia*; *Kalgoute, Shrebera swietenioides*; *Heggarige* or *Carissa carandas*; *Kadagal Kurli* or *Holarrhena antidysenterica*; *Batchanigemara-Gmelina Arboria*; *Billapatre* or *Aegle marmelos*; *Honne-Ptrocarpus marsupium*; *Hale-Wrightia tinctoria*; *Beete* or *Dalbergia latifolia.*

Match wood.

Wood required for match industry should be fairly soft and easily split. It should ignite easily and burn with a flame and when blown out should not smoulder. Woods suitable for the industry occur in the Mysore State and a list is given below showing the various kinds with their likely annual supply and selling rates.

Mysore match woods.

Table XIV shows the quantities of annual yield of not less than 10,000 c.ft., of important Mysore woods suited for match manufacture:—

Kannada name	Botanical name	Likely Annual supply in C. ft.	Selling rate per C. ft.
			Rs. a. p.
Bile Dhupa	Vateria Indica	40,000	1 0 0
Yettiga	Adina Cardifolia	30,000	0 10 0
Boorga	Bombax Malabaricum	20,000	0 10 0
Tari	Terminalia Belerica	20,000	0 12 0
Hebbalasu	Artocarps Hirsuta	20,000	1 0 0
Bende	Kydia Calycina	20,000	0 9 0
Kanagaloo	Dillenia Pentageyne	20,000	0 10 0
Dhupa	Boswellia Serrata	10,000	0 9 0
Godda or Gagalu	Odina Wadier	10,000	0 10 0
Mavu	Mangifera Indica	10,000	0 10 0

The above occur in the Shimoga, Kadur ar[illegible]sore districts.

Eight of the thirty Indian woods mentioned by Mr. R. S. Troup occur in the Province, together with a few others, and, these eight woods are:—

Hebbevu	... ...	Ailanthus Malabarica.
Kadavala	... ...	Anthocephalus Kadamba.
Buruga	... ...	Bombax Malabaricum.
Dhupa	... ...	Boswellia Serrata.
Golda	... ...	Garuga Pinnata.
Thaspsi	... ...	Holoptelea Integrifolia.
Neeranji	... ...	Salix Tetrasperma.
Amte	... ...	Spondias Magnifera.

Out of the 150 woods occurring in the Travancore State considered to be suitable for match manufacture, 20 are reported as having been actually tested and found to answer the purpose. Four of these that were tested occur in Mysore, *viz.*, *buruga*, *hebbevu*, *godda*, and *geru*; the first three of which happen to be common to the two lists given by Messrs. Troup and Rai Saheb Rama Rao Garu, Conservator of Forests in Travancore.

The Mysore State might be estimated to consume about one and one-sixth lakh of rupees worth of matches every year, corresponding to an average quantity of 1,87,000 gross of boxes of matches. **An estimate of Mysore consumption of matches.**

According to Mr. Troup, a factory with a daily production of 700 gross of matches and working 300 days in the year would produce about 2,10,000 gross which is just in excess of the Mysore needs, *i.e.*, one factory would be enough for the Mysore State.

The quantity of wood required for this factory would be about 65,800 c.ft. per annum. **Quantity of wood required.**

Out of the Mysore resources in match wood, *viz.*, *buruga*, *hebbevu* and *godda*, the first and the last are expected to yield only 30,000 c.ft. If the various other local woods be tested and found suitable, there need be no anxiety as to the quantity. For example, plantations of *buruga* would make the supply steady and permanent. **Local supply.**

Plantation of *buruga* or Bombax malabaricum is recommended, because, the wood is well suited both for matches and for packing cases. It is, besides, a rapid grower and grows well from seeds or cuttings and on grassy areas. Planting is consequently cheap as there is no forest to cut down. It yields silk cotton early giving a money return for some years before being cut. Moreover, the tree has been better studied than other match woods.

Table XV showing list of trees of the Mysore Province, suitable for Match manufacture.*

No.	Botanical name	Kannada name	Where found	Selling rate for Match Manufacture per C. ft.	Annual Supply C. ft.
				Rs. a. p.	
1	Vateria Indica ...	Bile Dhupa ...	Chiefly in Kadur and Shimoga ...	1 1 0	40,000
2	Adina Cardifolia ...	Yettega ...	Mysore, Kadur and Shimoga ...	0 10 0	30,000
3	Dillenia Pentagyna ...	Kanagaloe ...	Chiefly in Kadur and Shimoga ...	0 10 0	20,000
4	Bombax Malabaricum ...	Boorga ...	Mysore, Kadur and Shimoga ...	0 10 0	20,000
5	Terminalia Belerica ...	Tari ...	Do ...	0 12 0	20,000
6	Artocarpus Hirsuta ...	Hebbal... ...	Hassan, Kadur and Shimoga ...	1 0 0	20,000
7	Kydia Calcycina ...	Beng... ...	Mysore, Kadur and Shimoga ...	0 9 0	20,000
8	Boswellia Serrata ...	Dhupa ...	Chiefly in Mysore ...	0 9 0	10,000
9	Odina Wadier ...	Godda, Gagal ...	Mysore, Kadur and Shimoga ...	0 10 0	10,000
10	Mangifera Indica ...	Mavu ...	All Districts ...	0 10 0	10,000
11	Semicarpus Anacardium ...	Geru ...	Do ...	0 10 0	5,000
12	Ailanthus Malabarica ...	Hebbevu ...	Maidan District ...	0 8 0	5,000
13	Randia Gardneri ...	Kare ...	Mysore, Kadur and Shimoga ...	0 9 0	5,000
14	Vitex Altissima ...	Nowladi ...	Mysore, Hassan, Kadur and Shimoga.	0 10 0	5,000
15	Phyllanthus Emblica ...	Nelli ...	Do ...	0 9 0	5,000
16	Artocarpus Integrifolia ...	Halsu ...	Hassan, Kadur and Shimoga ...	1 0 0	5,000
17	Acrocarpus Fraxinifolius ...	Havalige ...	Hassan and Kadur ...	1 0 0	4,000
18	Macaranga Roxburghii ...	Uppalige ...	Kadur and Shimoga ...	0 12 0	4,000
19	Cordia Myxa ...	Chelli ...	Mysore, Kadur and Shimoga ...	0 10 0	4,000
20	Stereospermum Chelonoides	Kalludi ...	Do ...	0 10 0	3,000

* Supplied by Rao Bahadur M. Muthanna, Conservator of Forests, Mysore

Site for a factory.

As regards the site for a factory, Shimoga appears to be a very suitable one, as it satisfies the essential conditions therefor. Facilities of water transport from the forest to the factory are more likely near Shimoga than elsewhere. It is a railway station and favours a cheap transport to the areas of consumption. A permanent supply of water necessary to maintain a stock of moist wood and to feed engines, etc., are all available in Shimoga.

Capital required.

Mr. Roller estimates the cost of production under 9 annas per gross and takes sale price at 12 annas and that a factory might be started with a capital of about 1,80,000 rupees.

Comparative costs of the Japanese and German machinery.

Machinery on the Japanese plan cost only 75,000 rupees for a factory of daily outturn of 700 gross of filled match boxes. Finish and outturn are inferior to those of the production from German Machinery. The Japanese use wood in the machine, wherever practicable. Their success depends upon the efforts of the manager who is often the proprietor. Such machinery could be introduced wherever large factories would be impracticable.

The Belgaum match factory uses the Japanese machinery and produces matches nearly equal in quality to that of the matches imported from Japan.

Pencil Wood.

Resources in pencil wood.

Wood for lead pencils should be even textured and even grained and free from knots and other defects. Wood most used is Juniperus Virginiana, found in the United States and Canada. A species, Juniperus recurva, is reported to occur in the Province, which is equal to the former in quality. The quantity available is to be ascertained.

Other woods mentioned by the Conservator of Forests in Mysore are :—

Yettaga, Adina Cardifolia, *Gandhagarige* or Cedrella toona and Wrightia tomentosa.

Fibre Wood and Plants.

The principal fibre woods are :—*Bende* or Kydia Calycina; chiefly found in Mysore, Kadur and Shimoga districts; *Thadasal* or *Grewia Oppositifolia*; American Aloe ; found chiefly in Bangalore, Kolar and Tumkur districts; *Ficus Bengalensis*; *Crotalaria Juncea*; *Sagopalm*; *Bl[illegible] Frondosa*; *Carcya Arboria* and a few others.

Fibre yielding plants in Kadur.

OTHER FOREST FIBRES.—There are other fi[illegible]sides, which have been noticed by specialists and which are considered to be of some economic value. Mr. Cameron, formerly Superintendent, Lal-Bagh, has drawn attention to the existence of a number of fibre-yielding plants in the Kadur District, and an extract is given below from his "Suggestions for new Industries," published so long ago as 1900. It appears to me that his proposals are worth the serious consideration of the Forest Department, especially his suggestion for a nursery at the Tollola basin near Kuduremukh.

"There are hundreds of raw materials for the extraction of fibre grasses suitable for the manufacture of paper and numerous minor products of the hill tracts. If once established on these hills, I believe Bhabar grass *(Ischæmum augustifolium)*, from which such excellent paper is now manufactured in India, would succeed admirably.

"It has been amply proved some years back that a large percentage of the fibre-yielding plants of commerce can be successfully cultivated in Mysore, and that under favourable conditions a few of them would even run wild in certain localities.

Of this latter class such important plants as *Agave rigida var, Sisalana*, sisal hemp; *Furcraea gigantea*, Mauritius hemp; *Sanseveira zealanica*, bowstring hemp; *Bœhmeria nivea*, China grass; and *Bœhmeria tenacissima*, rhea fibre; may be specially mentioned.

"In the Kadur district there are also many fibre-yielding plants growing wild, both in the *maidan* and on the hills. The more important species seen on the way were:— Some species.

Hisbiscus cannabinus cultivated.
Urena lobata.
Urena sinuata.
Triumfetta angulata.
Helicteres Isora.
Grewia, several species.
Crotalaria juncea cultivated.
Calotropis gigantea.
Cordia myxa.
Debregeasia velutina.
Bombax malabaricum. } Silk, Cotton trees.
Eriodendron anfractuosum. }

"We possess, therefore, a considerable number of exotic and indigenous plants not only well suited to the climate but also affording textile products of indisputable value. With such advantages a substantial profit could be made from the cultivation of fibre-yielding plants: moreover, an industry of this kind worked on a large scale, would bring capital into the country. Should coffee, the chief industry of these hills, continue to fall in price, planters will begin to look around for better investments; and in the field of agriculture there is nothing more encouraging at present than the [illegible]red for fibre and rubber of the best qualities. The demand for [illegible] also greatly on the increase. With regard to local facilities for the [illegible] of rubber, I am not so sanguine, and pending fuller enquiry I do [illegible]cate its cultivation.

"In the m[illegible]po, I fear that little will be done until the Government lead the way, at [illegible]e extent of placing land and material within easy reach of the financ[illegible]ly think that one or two nurseries or small farms should be opened on the hi[illegible] a view to propagating useful plants and inducing them to run wild in favourab[illegible] localities, as the useless *Lantana* shrub has so abundantly done within recent years. If but a small proportion of the vast area of grass-land could be utilised in this way it would be a distinct gain to the State.

"But until lakhs of suitable plants are thus established, I do not predict great profits from the industry. In the Lal Bagh and at one or two other places we are experimenting with about two thousand fibre-plants, but except in the matter of propagation, these experiments are neither thorough nor final. What is required is more elbow-room, unstinted production, and a good decorticating machine to extract the fibre and demonstrate to the public. "Dears" machine recently tested at Howrah, near Calcutta, is said to be the best yet invented, and has proved very successful in the extraction of Ramie and other fibres. I would propose, therefore, to transfer such experiments to an equally favourable, if not better, locality, where growth might subsequently develop with much advantage to the country. It is by such practical action that nearly all great planting industries have been developed. The so-called Americana aloe, Agave Americana is growing well at Mudigere and Samsay, although the rain fall is heavy. At Kelagur, Mr. Danvers has the Mauritius hemp plant, *Furcræa gigantea*.

"Ascending to hills to the Kuduremukh, at the junction of the bridle-path from South Canara, there is a hollow or basin called "Tollollu." The elevation at this point is upwards of 4,000 feet and the basin on the Western side almost joins the boundary line with South Canara. It is a good grazing ground, and a large herd of cattle is grazed upon it for several months of the year. There is a perennial stream running through the valley, and it struck me as being an extremely good situation for a small hill-farm or trial ground for hardy industrial plants such as *Ban Rhea, Villibrunea integrifolia;* New Zealand flax, *Phormium tenax;* paper-grass *Ischæmum augustifolium;* and other species likely to take permanent root in such an exposed situation. The distance from Tollollu to Beltangadi, in South Canara, is about 12 miles. This is mentioned as in all probablity the latter town, which is an important one on the main road from Mudgere to Mangalore, would most likely be touched by the newly proposed line of Railway from Arsikere to Mangalore. But irrespective of railway, the district road from Nagoor (at foot of bridle-path) is only 26 miles from Buntwall on the Netravati river, where there is a daily boat service to Mangalore. The whole distance from Tollollu to Port is under 50 miles. In a clear day vessels can be distinctly seen off the Mangalore-Harbour. But this is best seen from the Kuduremukha, which is 2,000 feet higher.

"My object in recommending the Tollollu basin for experimental cultivation is therefore, two-fold. In the first place it would prove what can be done with new industrial plants in an exposed part of the Western Ghats, and secondly there would be no difficulty in moving produce to a good mart on the West Coast. This is the only experimental side which I would recommen[illegible] western side of the Kadur district.

"But one or two others might be started on the [illegible]ar the line of railway as possible. Administrative managemen[illegible]d to either the Forest Department or the Director of Agricultur[illegible]

"But the executive charge of each nursery sho[illegible]en to a local European planter who would take an active pe[illegible] in pushing the acclimatisation of hardy industrial plants on these [illegible] planters whom I met expressed the wish that other suitable cultu[illegible] be tried in the district and any action in this direction would, I am sure, [illegible]mend the interest and support of the planting community.

"This is merely a rough outline of my proposal, and should the Government approve of the scheme generally, I shall be happpy to work it out in detail."

Suggestion.—The Economic Botanist might be requested to work out the scheme as proposed by Mr. Cameron, if he approves of the idea and if nothing has been done already.

Some Agricultural Fibres.

Cocoanut fibre.

The most important fibre which is not extensively used at present and which is available in large quantities is that from the shell of cocoanuts. A few families are no doubt engaged in preparing ropes for domestic consumption and for local sale in Honnavalli, Tiptur and in a few other villages near Channapatna. The fibre is not extracted on any commercial scale since most of the shell is consumed as fuel.

Quantities available. Large quantities wasted.

According to Sir George Watt, 10 husks yield about 1 lb. of coir and at this rate, the yield per acre would be 200 lbs. or 8 maunds of 24 lbs. each. This quantity at Rs. 1-8-0 per maund would represent a coir value

of Rs. 12 per acre. From local enquiries made at Tiptur it was ascertained that nearly half of the cocoanut produced in the Tiptur and Chiknayakanhalli taluks is allowed to dry up on the palm for the production of copra, as it is in great demand in Bombay, Delhi and other parts of Northern India. The cocoanut area round about Tiptur and Chiknayakanhalli amounts to about 26,000 acres (about 65,000 acres for the whole Province). Even assuming that half the cocoanuts from the whole area is converted into copra, and not yielding any coir of any value we have still a coir area of about 32,500 acres available for an industry in coir. This is exclusive of the yield from the trees in gardens where both cocoanut and areca nut are grown. At Rs. 12 per acre the total quantity of coir available might be estimated at about 2,700 tons of a potential value of about Rs. 4 or 5 lakhs. It may be that this coir is not so good as that of Cochin and Malabar but, as it is available in such large quantities, some use is to be found for it. A part of the local supply is no doubt utilised at present for matresses and for inferior kinds of ropes needed for agricultural purposes. But a very great quantity is still wasted as fuel.

Quality of fibre.

It appears that the fibre from cocoanut grown in areas distant from the coast is coarse and that fresh water injures the fibre. Accordiug to local opinion best fibre can be obtained from nuts cut just after 10 months, while variety, care and skill in preparing also count. According to Wisener only 3 varieties are really suitable for the production of coir, *viz.*,

Coeus nucifera rutila.
Do cupuliformis.
Do stupposa.

the first named giving the best and most elastic fibre.

Mysore varieties might be studied scientifically.

I am not aware if the cocoanut palm of Mysore was studied from a scientific point of view and if not, the subject might be taken up and information collected as to the existence or otherwise of the varieties most suitable for coir and of the value of the coir from those now grown.

Almost the whole of the coir trade of Malabar is with the two parts of Calicut and Cochin, where several coir presses have been established. At Cochin Messrs. Brunton & Sons., Volkart Brothers, and Messrs. Pierce Leslie & Co., have presses and the last named firm has a press at Calicut also. Messrs. Brunton's press employs 60 hands.

The Malabar process of manufacture of coir is as follows :—

Process of manufacture to be studied at Cochin.

The husks of cocoanuts are soaked for six months or longer in water, being buried in pits as near as possible to the water line of rivers and back waters. The colour of the yarn, which regulates to a great extent the price it commands is said to depend very much on the water in which the husks are steeped. It should be running water and, if possible, fresh, as salt water is said to affect the colour of the yarn injuriously. On being removed from the pits, the fibre is beaten out with wooden hammers by women, is dried in the sun for twelve hours and is then ready to be pressed and baled for export. Fibre is also extracted from the stalks of the leaves of Palmyra palms in some parts of Palaghaut taluk and exported to Ceylon and elsewhere. Most of the fibre is exported as yarn. There are certain matting works and roperies in the district (Messrs. Guodacre & Sons, works at Cochin make coir mats and employ 150 hands daily), and it is stated that "excellent ropes and mats are made in Cochin and a coarser quality in Calicut."

Suggestion:—In the Tumkur Industrial School, there is a small and cheap appliance for preparing thick coir rope from thin ones. This arrangement might

be popularised at Tiptur or a Special Officer deputed to Cochin to study the coir industry there, with a view to introduce it into the cocoanut area round about Tiptur.

Areca fibre. Fibre now wasted and enquiry desirable.

There is another fibre which is now going to waste and which is a source of great nuisance to the village population owning areca gardens. Whether any use could be made of this fibre is a point worthy of detailed enquiry, especially as the supply is constant and also great.

Quantity available.

From enquiries made at Birur it was ascertained that 40 maunds of green nuts of areca yield about 3 maunds of areca nut ready for the market or a little over $\frac{1}{13}$th of the weight of the green nut. If eight lakhs of maunds represent the annual yield of areca nut for the whole areca plantations in the State, the quantity of fibre corresponding to this will be something considerable.

By actually weighing the pod, nut and fibre at Tarikere, I found that, on an average, each green areca pod with shell and nut weighed about $1\frac{1}{2}$ tolas and the nut inside just half a tola. This relationship was found to be approximately correct in the case of every experimental weighing made at the place. Every green nut, when cut, boiled, dried and prepared, ready for the market was found to weigh between $\frac{2}{7}$ths and $\frac{1}{4}$ths of its original weight when green. The outside shell with or without the thin green skin also loses about 75 per cent of its weight on thoroughly drying.

It may therefore be taken that for every one-eighth of a tola of areca prepared we get about $\frac{2}{3}$ths of fibre, *i.e.*, the quantity of areca fibre when thoroughly dried is just double the quantity of the nut prepared from the same pod containing both the shell and the nut.

This calculation shows that the weight of a prepared nut is about one-twelfth of the weight of the green pod from which it was extracted, the shell making $\frac{3}{12}$ths or one-sixth and the total weight of both amounting to 25 per cent of that of the green pod.

Sixteen lakhs of maunds—an estimate.

We could therefore get some rough idea of the quantity of fibre available in the whole State, corresponding to the quantity of nut produced, the one being about double the other. If eight lakhs of maunds represent the weight of the annual output of prepared areca, then the fibre would weigh about 16 lakhs of maunds and this is a sufficiently large quantity for any industrial enterprise.

Possible uses for areca fibre and value.

Even if it be not found to be suited for any kind of weaving such as, matting, etc., it would come in very well for stuffing matresses, etc., and for all upholster work. Whether it would suit for the manufacture of any coarse kind of paper is a point best decided by experts. The fact that a large quantity of this is available here and that no use whatever is made of it, is an important point to be brought to the notice of the Conference and Government. Even if a maund should fetch only eight annas, there is a potential value of about eight lakhs of rupees in this fibre now going to waste.

The most important fibres used in weaving of fabrics, *viz.*, cotton, silk and wool will be considered in Part II.

Poondi fibre or san hemp.

There are two more sets of fibres available in the State and which are woven into some sort of coarse articles which are yet to be considered. There is a fibre called *san hemp* from which are prepared long narrow *goni thattus* stitched into bags for grains to be loaded on pack bullocks or asses. This work is being done

on a very small scale at Kibbanahalli, near Banasandra, at Chelur, at Doddaballapur and at a few other places. The fibre available is not much in quantity and the weaver gets practically nothing out of his business, any little profits he earns being derived by the sale of the seed of the plant and wages in *goni-weaving* do not amount to more than 2 or 3 annas per day.

Kattale.

Kattale or Agave fibre is extracted on a very small scale from the plants along village hedges and Railway lines and used for domestic purposes. Here and there the fibre is also spun into thread for weaving in mats.

Paper Pulp.

Paper and Pasteboard consumed by Mysore

An average of one and a half lakh of rupees worth of paper and pasteboards is being imported into Mysore every year and about 100 lakhs worth into the whole of India and the share of Mysore is roughly in proportion to its population.

Raw material available and required.

Of the various raw materials required, bamboo is the most abundant in Mysore and the Conservator of Forests estimates that about 50,000 tons of that giant grass suited for paper pulp are available every year. This in itself is a large supply, since about 250,000 Bengal maunds or less than 10,000 tons of raw material would be enough for a decent sized Indian Paper Mill.

Rice straw.

According to the paper expert Sindall, rice straw could be easily converted into paper pulp and this was found to be tough, bleached to a good colour and would work up into good paper and if only partially boiled, the pulp proved to be hard and tenacious, very suitable for the manufacture of a tough cardboard for box making purposes.

Whether any rice straw can be spared for this purpose is a point which requires enquiry.

Bhabar grass.

Mr. W. Cameron in his "New Industries for Mysore" states that grasses suitable for the manufacture of paper occur in parts of the Kadur district and considers that cultivation of *bhabar grass, Ischaemum augustifolium*, could be established in the Tollollu basin, near Kudremukha.

Electrolytic bleaching of bamboo pulp.

If sufficient quantities of bamboo be available near some of the falls and if electrolytic bleaching of bamboo pulp could be introduced with advantage, then the three most important causes now operating against paper mills in India, dearness of supply of raw material and of power and heavy cost of chemicals, will be practically absent. Detailed investigation seems therefore necessary.

Old local method of manufacturing paper.

Some rough paper was being prepared at Dodderi, Challakere taluk and also at Ganjam near Seringapatam and at one or two other places. The industry is completely extinct now.

The raw material used was *Gonithattu* or old gunny bags. It was beaten with water by a massive wooden lever of wood raised by the weight of persons over the other end of the beam and let fall. The arrangement is exactly similar to that used in pounding paddy.

The pulp is then washed in water and bleached by the efflorescent soda and lime from *kankur* limestone, both of which are available locally. The bleached pulp is then charged into a masonry tank containing water.

Thin mats of local broomsticks mounted on a small frame were moved up and down in this tank containing water and pulp and the pulp deposited on the surface of the mat. This deposit is well drained and turned over on to the surface of a masonry platform or floor and slowly dried at first in shade and then rapidly in the sun. Polishing the surface of each paper with soapstone powder and a conch shell completed the process.

Three persons were engaged in each establishment and there were several such in the villages of Katappanahatti and Parasurampura in the old taluk of Dodderi. Samples of this paper are still available in the offices at Challakere and Chitaldrug.

Tans.

Mysore resources in tans are great and a list is appended of Mysore trees and plants which yield tanning materials.

Mysore Resources in tans.

The European capitalist finds it pay to extract tannin from woods and barks containing as low as 3 to 4 per cent of tannin and many of the Mysore woods contain a much higher percentage of that principle.

For example, the bark from *Kempu dhoopa*, Shorea robusta—sal bark, yields from 8 to 9 per cent of tannin; seeds from *Dhoopa*, Veteria indica, yield 25 per cent. The white ordinary *mavinamara* contains 16 per cent; *Jali*, Acacia arabica, one of the most popular tanning materials yields from 5 to 26 per cent, according to age.

Kagli, Acacia catechu, yields catchu, containing 60 to 70 per cent of tannin.

The bark of *Bile jali*, Acacia leucopholia, used in distilling arrack contains 20 per cent of tannin and is reported to be as good a tanning agent as the babul bark.

N. B.—Mr. Troup considers that the wood of this tree may possibly be of use for wood-pulp, in which case, the bark will be a waste product and available for the extraction of tannin.

The famous *thangadi chakke*, bark of Acacia auriculata is a valuable tannin material and for the purpose is collected largely from the districts of Chitaldrug, Tumkur, Kolar, etc. The yield is 11 per cent of tannin from the bark of young trees and 20 per cent from that of the mature.

Alalekoy, is the fruit of the tree Terminalia chebula and can yield 47 to 59 per cent of extract, containing 31 to 80 per cent of tannin.

Large quantities of this and of the former are available in the Province and an industry to extract tannin might become a paying concern. Even the bark of *alale* tree yields tannin, the percentage of extract varying from 31·2 to 45·8, yielding 27·5 to 84·9 per cent of tannin.

The bark of *Matti*, Terminalia tomentosa, is considered quite as good as sal bark, though it is reported to impart an objectionable dark colour to the leather. This can be eliminated when tannin is extracted on a large scale.

Preparation of tannin extracts.

Bark and wood are generally used for tanning purposes. They are bulky articles of transport; hence extracts are prepared from them. The extracts besides being portable also shorten the process of tanning.

The process might be divided into 3 stages. The bark or wood is cut into small pieces and the tannin extracted by the action of hot water or steam and lastly the extract is mechanically filtered and then evaporated in vacum pans.

Method suited for India.

It appears that among the various methods of manufacturing Tannin extracts, the most suitable for India is probably that known as Vallon's process which requires no chemicals. It is also pronounced to be very simple, capable of producing a good quality of extract with a high percentage of tannin.

There are several rough and ready methods of manufacturing tannin extracts, for example, that employed for making cutch, the general principle being to heat the chips or shavings with water and continue heating the liquor obtained with successive fresh relays of chips. It is essential that the chips should be very fine,

being even pounded in the case of bark, while in the case of wood, shavings are the most suitable form of fragments to employ.

Mr. Troup gives an estimate of a model extract factory based on the calculation of Messrs. Dumaney and Noyar, the eminent Chemical Engineers of France. The factory is to treat 60 tons in 24 hours. It is considered an ideal industrial remunerative concern and to cost about 2 lakhs of rupees for plant and working. **Estimate of cost of an extract factory.**

They calculate a gross profit of 30 to 33 per cent on the total outlay. It should be noted here that when this profit is yielded by the treatment of chesnut wood with 7 to 10 per cent of tannin content, under European conditions of highly paid labour, there is every reason to believe that a factory working under the comparatively cheaper labour conditions of India would yield a still greater margin of profit.

The estimate given in the above paragraph is for a model factory for the extraction of tannin woods. But materials like myrobolan and acacia barks can be extracted with profit even on a much smaller scale of operations. With a capital expenditure of Rs. 50,000 on the plant, an extract factory can be started which should be able to turn out a minimum of 1 ton of finished extract per day.

The heart wood of Acacia catechu, *kagli*, is cut into small chips. These are boiled in water in earthen pots till half the water disappears. This takes about 12 hours. The liquid is then transferred to an iron vessel, boiled again and stirred. It is then poured into another wooden vessel and allowed to cool, when it hardens into brick like masses. The yield of cutch is 3 to 10 per cent of the weight of the wood used. **Preparation of cutch or catechu.**

Forest Oil Seeds and Vegetable Fats.

The more important trees of the maidan tracts which yield oil-seeds from which oil is being extracted locally are *Honge*, *Pongamia glabra*; *Ippe*, *Bassia latifolia*; *Bevu*, *Melia azadirachta* and a few others. **Oil seeds from trees.**

They occur as avenue trees and in the forests. *Honge* is found to line the road side in parts of the Kolar, Bangalore and Tumkur districts; *Bevu* in the Chitaldrug district and *Ippe* in the Tumkur district and other parts.

The ryots collect the seeds, extract the oil and utilise for lamps and for culinary purposes, the cake being used as manure. The seeds of *Kandala*, *Schleichera trijuga*, yield an oil used for soap making.

The *Ippe* flower called *Mahua* flower yields a spirit, known as the *Mahua spirit*, and a local export of the flowers to parts of the Bombay Presidency is reported.

The seeds of *Dhupadamara*, Vateria Indica occurring abundantly in the western most *malnad* of the Province when bruised and boiled in water yield a solid fatty oil, known as the Malabar tallow. It is also called piney tallow or vegetable butter of South Canara. It is used for lamps, as a substitute for ghee and medicinally for external application in rheumatic complaints. This tallow was once employed in the manufacture of candles. **Various uses.**

According to useful plants of India by Col. Drury, the candles were once introduced into Europe but a very heavy duty was imposed and the trade ceased. **Manufacture of candles—an old industry.**

Whether this manufacture was confined to the Malabar Coast or whether it was practised in parts of the Mysore State is a point for enquiry. **A point for enquiry.**

The resin obtained by incision into the trunk of the tree can be used in making varnishes. Imitation amber beads were also being prepared therefrom.

Vateria malabarica, *Velli koondricum* yields seeds which when treated as above give rise to a solid fatty oil.

What is known as kokum oil or butter is derived from the seeds of *Garcinia purpurea*.

The seeds of Mysore gamboge tree or *Garcinia pictora* occurring all along the ghats also yield an oil when they are bruised and boiled with water.

Mysore gamboge. It yields a pigment called the gamboge pigment. As the quantity of its supply is likely to be large the subject deserves investigation.

Enquiry desirable. There are various other plants, the seeds of which yield an oil similar to the above.

The whole subject deserves a detailed enquiry as the vegetable fat might be utilised in place of lard for manufacturing perfumed pomades.

The leaves of same forest trees like those from *Dalchini*, *Cinnamomum ivers*, and several grasses like the lemon grass yield essential oils and an account of these is given in the Chapter on Oil seeds and Oils, Part II. The subject of gums and resins deserves a detailed study.

Miscellaneous.

Walking sticks. An industry can be started to manufacture walking sticks as there is a good demand for them. The qualities that go to make up a good walking stick are, decent appearance, straightness and toughness. Several kinds of woods are used for the purpose, besides bamboo, canes and palms.

Mysore woods suited. The following varieties of wood occurring in Mysore are suitable for the purpose namely, *mallali* or *Kare-Diespyros ebenum*, *Bage* or *Albizzia lebbeck* and *Angarakanagida* or *Murraya exotica*. Names of numerous other varieties of woods, as well as canes are given in "The Forest Utilisation" by Troup.

Saw dust. Saw dust as well as pieces of wood may be utilised economically. What is known as *xylolith* in commerce is made up of saw dust cemented into a very firm material and used for flooring, panelling, etc. Saw dust is also a good packing material, is free from dust and if it be dried it may be also used as a litter, since it absorbs liquid more readily and is clean and healthy. The manure from saw dust litter is considered good as it rots quickly. Mixed with clay it can be made into light bricks which are porous. When mixed with mortar it is supposed to increase its porosity. Various substances are manufactured from saw dust namely, cellulose, vinegar, alcohol, sugar, gum and oxalic acid.

Waste wood may be shaven into fine strips by special machinery and they are light clean and elastic and can be used for packing and stuffing matresses.

Casks. Manufacture of casks from split wood is another industry which might be started and developed. A considerable number of these is required for breweries, distilleries and also for packing and transport of dry goods. Export of oil likely to develop consequent upon the starting of oil mills would require numerous casks to transport the oil from one place to another, at least in India.

The wood should be tough and strong to bear transport, be durable, water-tight and not heavy.

Wooden tubs. Manufacture of *wooden tubs* might be started and developed. It appears that teak, mango, *bachanigemara* or *Gmelina Arboria* and *gogal-Adina Wodiar* and *Tari-Terminalia belerica* are suited and that casks can be made of *kempuburuga* or Bombax malabaricam.

Packing cases. Wood for packing cases, should satisfy several conditions. It should be light, easily worked, fairly soft, so that nails could be easily driven without causing the

wood to split. It should not contain any colouring matter. Most important condition is it must be cheap. *Gandagarige* or *Cedrella toona*, *Mavu* or *Magnifera indica*, *Buruga* or *Bombax malabaricum* and *Kadavala* or *Anthocephalus cadamba*, *Belangi Acro-carpus fraxinifolius*, *Hale Garuga pinnanta*; *Modi* or *Boswellia serrata*, are some of the Mysore woods suitable for the purpose, especially *Bombax malabaricum* or *Buruga*.

Canes and Reeds.

Kinds of cane.

Several varieties of cane are available at Agumbe :—(1) *Halubetha*, (2) *Hasurubetha*, (3) *Hemdibetha*, (4) *Kayibetha*, (5) *Sannabetha* and (6) *Neerbetha*. *Halbetta* is most used for preparing small bags, scale pans, balances and for this purpose it is split into 18 splits. *Hasarubetha* is used for baskets, for carrying earth and manure ; also for open baskets for carrying leaves and for collecting grains. *Kayibetha* is used very commonly. *Sannabetha* usually 40 feet in length, is used for drying clothes. *Neerbetha* is brittle and is not worked.

These canes grow abundantly all along the ghats over a length of 150 miles, but they have to be cut and carried as head loads, each head load usually consisting of 12 canes of 20 to 25 feet in length.

Quantities utilised and articles prepared.

One man, at 4 annas cooly per day, collects one head load of $2\frac{1}{2}$ local maunds. He spends another day in splitting the canes into 2, 4 and 8 parts as the case may be and the third day in preparing baskets at about 16 per day and valued at about one rupee, that is, he earns about one rupee in three days. No work is done during the 5 rainy months. He collects for 7 months and works. A calculation shows that about 70 head loads are required for one man but the Holeyars who are engaged in this work are very much needed for reaping paddy and other crops and for other agricultural operations, for nearly 3 months, so that they do not prepare baskets for more than 4 months in the year. The whole production is consumed locally and some baskets prepared of *watte* are sent to Coffee Estates. Several articles prepared out of the finer variety of cane are :—bags, scale pans, boxes, etc. Two bundles of cane are required for one box and for this he gets Rs. 1-4-0. Thus his cooly for preparing will be Re. 0-12-0 and Rs. 1-8-0 for special boxes for keeping sacred cloths. A cradle which is $2\frac{1}{2}' \times 1' \times \frac{1}{2}'$ is sold for Rs. 1-4-0, Re. 1-0-0 being the wages.

Cane of Agumbe is given out on contract for Rs. 100 per year. By this system the cooly is a loser.

Several materials are available at Agumbe and other ghats to prepare baskets, mats and other rattan works.

Watte a kind of thick hollow reed of 2 inches in diameter and 15 feet in length grows extensively along water courses and is used in place of reepers in roofing. It is also used for baskets, bags, grain stores, plates and mats for drying work. It is supposed to increase in strength by exposure to smoke, especially after being blackened thereby.

Suggestion.—It is advisable to abolish the contract system of disposing the cane in *malnad* so as to encourage the *Holeyar* to get a greater income; if possible, he may be required to pay a very small seigniorage on every head load he brings, say at $\frac{1}{2}$ anna per head load.

As cane grows in abundance near the Maranhalli ghat, Agumbe ghat and also near that of Kollur in Nagar taluk besides in the western parts of Sagar, about 20 men may be encouraged to settle at each of these places and trained to prepare articles out of cane and of *watte*. A small school might be started at each of these

places; or one itinerant teacher might be engaged to teach them more artistic designs in rattan work, spending about a month in each place in a season. The coffee planters would readily consume all the baskets that the men could turn out. Many of the planters would require better finished articles than at present and they are prepared to pay for the same. If dwarf date plant or *sanneechalu* can be had in abundance in some of the open tracts to the east of these ghats, a further set of 50 men, known as *koramars* might be induced to settle at these three places, especially at Maranhalli and Agumbe so as to be able to supply planters with mats also.

The system of letting out cane on contract which is in force at Maranhalli might also be abolished and only a portion of the loss in income recouped by levying half an anna on each head load.

APPENDIX TO CHAPTER II.

List of some of the Mysore Flora yielding Tans and Dyes, Gums and Resins and Medicinal Drugs and Chemicals.

Names		Remarks
Kanarese	Botanical	
Tans.		
Neeranjee chakke	Salix tetrasperma	
Neeli chakke	Emblica officinalis	
Muttukada chakke	Butea frondosa	
Jali chakke	Acacia arabica	
Bilee jali chakke	Acacia leucopholea	
Khagli marada Chakki	Acacia catechu	
Burgada chakke	Cochlospermum gossypium	
Thangadi chakke	Cassia auriculata	
Kakke chakke	Cassia fistula	
Matti chakke	Terminalia tomentosa	
Arale marada chakke	Ficus religiosa	
Divi-divi	Caesalpinia coriaria	
Jalikoy	Acacia arabica	
Kalgarige	Soymeda febrifuja	
Tarekoyi	Terminalia belerica	
Byalada vati	Feronia elephantum	
Khagli kachu	Acacia catechu	
Dye Stuffs.		
Rangamale bija	Bixa orellana (arnotta)	
Thagackee beeja	Foetia cassia	
Patangada chakke	Caesalpinia sappan	
Kapilabanna	Rottleria tinctoria	
Mancheshti	Adenthera pavonina	
Pappali chakke	Ventilago madaraspatana	
Machi koyi	Quercus infectoria	
Devadari	Erythroxylon monogynum	
Muttukada beeja	Butea frondosa	
Muttukada hoovu	Butea frondosa	
Maradarashina	Coscinium fenestratum	
Geru beeja	Semicarpus anacardium	

List of some of the Mysore Flora yielding Tans and Dyes, Gums and Resins and Medicinal Drugs and Chemicals—*contd.*

Names		Remarks
Kanarese	Botanical	
Alle kayi	Terminalia chebula	
Arishana	Curcuma longa	
Kallu hoova	Parmelia perlata	
Adike kanchu	Areca catechu	
Ramapalada kayi	Anona reticulata	
Ramapalada sippe	Anona reticulata	
Neragunji sippe	Tamarix ericioides	
Nerale chkke	Eugenia jambolana	
Kasturi jali kayi	Acacia farniciana	
Allekayi chakke	Terminalia chebula	
Challe chakke	Zeziphus xylopyrus	
Bavinia chakke	Melia azadirachta	
Rubbaragidada kayi	Ficus elastica	
Antavalada kayi	Sapindus trifoliatus	
Lavancha	Andropogon muricata	
Bidarakki	Bambusa aurundinacea	
Nabhi	Aconitum feroxconite	
Nelli kayi	Emblic myrobolams	
Gulagunji	Abrus precatorius	
Jangalibadami	Terminalia catappa	
Chille beeja	Srychnos potatorum	
Bhaja	Acorus calamus	
Bidaruppu	Bambuso aurundinacea	
Kachora	Curcuma zeodaria	
Shunti	Zingiber officinale	
Gums and Resins.		
Dindigada gondu or gum	Anogeissus latifolia	
Barina gondu	Melia azadirachata	
Jali gondu	Acacia arabica	
Bile dhoopa aragu	Veteria indica	
Karee dhoopa aragu	Garcinia gamboge	
Kempu dhoopa aragu	Shorea robusta	

List of some of the Mysore Flora yielding Tans and Dyes, Gums and Resins and Medicinal Drugs and Chemicals—*contd.*

Names		Remarks
Kanarese	Botanical	
Guggula aragu	Garcinia Indica	
Dinki malli aragu	Gardinia gummifera	
Halmaddi	Canarium strictum	
Bilpatre gondu	Aegle marmelos	
Medicinal Drugs and Chemicals.		
Datturi beeja	Argemone mexicana	
Vumotti beeja	Datura fastuosa	
Atimadhura	Clycyrrhiza glabra	
Kolavanki beeja	Hyglophila apinosa	
Talsipatri	Abies webbiana	
Dumprasini	Alpinia galanga	
Sunamukhi ...	Cassia absus	
Adamattada be ...	Tylophora asthamatica	
Kadigaragu	Eclipta alba	
Vishnukranti	Evolvulus alsinoides	
Narambajli	Gynandropsis pentaphylla	
Kadumenasinakayi	Capsicum frutescens	
Nagadale	Ruta graveolens	
Vandelaga	Hydrocotyle asiatica	
Vishamadari	Clerodendoon inerme	
Hirehippali	Lippia nodiflora	
Kirinelli	Phyllanthus niruri	
Kolavanke	Sippe hygrophila spinosa	
Buddagala	Momordica diocio	
Karilabli	Vitex negundo	
Adusoga	Adhatoda vasica	
Manjinaru	Sansevieria zelyanica	
Vajranite	Indigofer tinctoria	
Neerubomma	Herpestis monniera	
Kuppe soppu	Acalypha indica	
Dodipatre	Coleus aromaticus	
Gullada beru	Solanum xanthoccarpum	

List of some of the Mysore Flora yielding Tans and Dyes, Gums and Resins, and Medicinal Drugs and Chemicals—*concld.*

Names		Remarks
Kanarese	Botanical	
Chitramoola	Plumbago zeyalanica	
Iswari beru	Aristolochia indica	
Gulaganjis balli	Abrus precatorius	
Tuttusrimudra	Abutilon indicum	
Chirayita	Swertia chirata	
Nelabevu	Andrographis paniculata	
Billapatra beru	Aegle marmelos	
Mangurali	Vitis quadrangularis	
Lolasara	Aloe littoralis	
Amrutaballi	Tinospora cordifolia	
Kakke beru	Cassia fistula	
Tugadi beru	Cassia auriculata	

CHAPTER III.

MINERAL RESOURCES.

Besides the three minerals, gold, manganese ores and chromite, which are being extracted, there are 15 others of commercial value occurring in the State. An idea of the distribution of many of these mineral deposits can be had from a glance at the Geological and Mineral Map of Mysore, Plate 1, kindly prepared by the State Geologist for this Report.

Gold.

Kolar Gold Fields constitute the only gold producing area in the State, although there are a few other localities where some prospecting work has been going on with greater or less success.

Production of gold in the State began in the year 1882 and has been continuing since.

Total Value of gold won. The total value of gold won from the commencement of the mining operations up to the end of 1911 was £35,985,802, and during the year 1911 the value of the precious metal produced was £2,129,873 in round numbers.

Average values. Annual. Quinquennial. Decade. The average annual value of gold won during the last 29 years ended 1911 was slightly over 1·24, millions sterling, equivalent to about 186 lakhs of rupees per year. The production has been increasing from the commencement and the average value during the last decade or two would be much greater than this amount. The average annual production during the first half of the decade 1901-10 was over 2·17 million sterling, that is, 326 lakhs of rupees in round numbers, while during the second half, the average annual value declined slightly to 2·09 millions sterling or 313·5 lakhs of rupees. The average for the decade works to 319·5 lakhs of rupees.

Dividends The Companies paid as dividends a sum of nearly 14·44 millions sterling up to the end of 1911.

The average annual earnings of the share holders during the first half of the decade were greater than during the second half, the amounts for the two halves being 144·75 and 102 lakhs of rupees respectively.

Wages. The amounts paid as wages during the two periods were 68·4 and 80·55 lakhs of rupees respectively, or a decade average of about 75 lakhs of rupees in round figures.

Royalty. Government earnings in the shape of royalty amounted to 16·1 lakhs of rupees during the first quinquennial period and to about 15·9 in the second or an average of about 16 lakhs of rupees for the decade 1901-02 to 1910-11.

Iron Ore.

Two of the more important deposits of iron ore occurring in the State have been studied in some detail by the Geological Department and information published regarding the quantity available and the average quality. One of the deposits occurs near Malvalli and the other in the Bababudan Hills.

The Malvalli area. The iron ore of the Malvalli area is magnetite in composition, giving an average of about 57 per cent of the concentrate assaying 62 per cent of metallic

Ore comparatively poor and expensive

iron. Dr. Smeeth, the State Geologist, estimates that one million tons of this ore could be got from the area without difficulty and probably several times that quantity. He also estimates the cost of quarrying from 3s, to £0-3-6d per ton of the ore body and 6s, to 7s, of the concentrate, which together with a cost of £0-3-8*d* for briquetting would swell the amount to 10s-8d per ton.

Thus it is seen that this ore is neither very rich nor particularly inexpensive.

The Bababudan area.

The long famous iron ore of the Bababudan Hill ranges varies in composition from a pure magnetite to limonite with corresponding variations in the metallic content, from 65 to 55 per cent. Dr. Smeeth gives a conservative estimate of 3 square miles in area for the spread of this ore and states that the quantity available is 25,000,000 tons of 60 to 65 per cent of iron content, and if the ore continued to a depth of at least 10', the quantity would be more, *viz.*, about 83 millions of tons of 55 to 58 per cent of metallic iron.

Quantity and quality of ore available for electric smelting.

In his notes on electric smelting of iron and steel, from which the above information is compiled, Dr. Smeeth states that, assuming it possible to make and dispose of 10,000 tons of electrically smelted steel per annum, the amount of ore required would not exceed 20,000 tons. At this rate, the quantity of ore available in the Bababudan Hills alone would last for centuries and even if the smelting plant of 1,00,000 tons capacity per year be set up, it need not be stopped for several generations merely for want of ore, that is, the quantity of ore available in the Bababudan region is practically inexhaustible.

Cost of winning the ore.

The cost of winning the ore is worked out at £0-1-4 per ton at the quarry and £0-1-6 to £0-2-0 at the smelting works on a modest scale.

Charcoal required.

The method of smelting the ore by electric power as studied by Dr. Smeeth in Turin, Italy, necessitates the use of charcoal before the ore is charged into the furnace and the quantity of charcoal so required is estimated at about 3,500 tons per annum for producing 10,000 tons of electrically smelted steel.

Sufficient forest area available for preparing charcoal.

He is satisfied that, at the foot of the Bababudan Hills or in any part of the Kadur and Shimoga districts, an area of 300 square miles of forests of good fuel yielding capacity could be found to supply this quantity of charcoal.

Flux.

He has also gone into the question of the availability, quantity, quality and cost of fluxing material, *viz.*, carbonate of lime and has stated the lime deposits near Huliyar as being the most satisfactory in all respects, not costing more than 10 shillings per ton at the works.

Amount of Power required for electric smelting.

The amount of power required to produce 10,000 tons of steel per annum is estimated at 20 millions of kilo-watt-hours and at 7,000 working hours per year, the capacity of the plant would have to be about 3,000 kilo-watts or 4,000 H. P., to be derived from, say, water power.

Amount of Power available.

After examining the several sources of water power available in the Kadur and Shimoga districts, Dr. Smeeth appears to be satisfied with a project suggested by the late Captain Dawes, *viz.*, of bunding the water of the Somavahini Valley near Malandur and taking the water along the sides of the valley in a pipe to a point above Muttodi, where a fall of 700 feet could be obtained. Captain Dawes

Its cost.

estimated that this fall would give about 5,000 H. P., and that the capital would not be very large, so that, in all probability the power may not cost more than £3 to £4, per H. P., per year, delivered at the smelting works, which should not be more than 15 miles away.

Manganese Ores.

Ores of manganese occur in several parts of the schist belts of the State. There are seven license holders who are quarrying and exporting the ore, the largest being the Worthington Iron and Steel Co., Ltd., with a capital of about £1,50,000. These own some of the best properties near Kumsi. **Chief license holders.**

During the Russo-Japanese war, the supply of manganese ore from Russia was stopped and consequently the Indian mineral captured the European market. The price rose and a great activity was developed but before many of the mine owners could realise any returns, the market went down as the Russian ore regained the market after the cessation of the hostilities and many prospectors in Mysore, as well as in other areas such as the Bombay Presidency sustained heavy losses. **Fluctuations in manganese market.**

Manganese is sent out of the State from the stations, Chikjajur, Sivapur, Maserhalli to Bidare, Shimoga, Banasandra, and Yelladabagi. During the three years 1909, 1910 and 1911, 41,880, 42,518 and 21,573 tons were collected and 9,512, 16,384 and 12,958 tons were respectively sold. **Export of ore.**

If electric smelting of iron ores be started, some of the manganese ore can be utilised locally. We may export ferro-manganese and manganese steel and also utilise the mineral to prepare various chemicals. Potassium permanganate is the most important of these. Quantities of pure stuff necessary for this manufacture are available in several tracts in the State. **Ferro manganese and chemicals**

Chromite.

This mineral occurs in commercial quantities near Kadakola, Mysore taluk and also near Nuggehalli, Tiptur taluk. The Kadakola deposit was worked for a time and then stopped for want of proper demand for the ore. 4,727 tons of chrome ore were collected in 1909, of which 4,150 tons were sold. **Deposits.**

No quarrying work was done in the other deposit.

Chromite is chiefly used in the preparation of chrome-steel. Chrome bricks for furnace lining is another use. **Uses of chromite. Chrome steel; chrome bricks and chemicals.**

Chromite is also used in the arts to prepare various chemicals. Potassium bichromate is the most important, from which several others are prepared. The amount of the ore available is large enough for this purpose and it is a waste now for want of demand. The local demand for Potassium bichromate is not great but an export trade in the salt might be set up, if it could be prepared cheap enough. The potash that is required has to be got from abroad. The question will have to be worked out whether it will really pay to manufacture it on a large scale for export.

Suggestion.—The destruction of lantana has to be undertaken sooner or later, by private agency or by Government. Near Nanjangud and Kadakola, lantana is very abundant. As the ash of the plant contains 13·26 per cent of potash, an experiment might be made to ascertain if it would pay to destroy lantana from a given area, also the quantity of ash derived by burning the destroyed plant and to see if the potash cannot be lixiviated and evaporated down by the heat of burning another lot of lantana itself. If it be found that it pays to collect the potash from the plant, then, by tom-toming, the villagers might be made to know of the fact. A simple devise might be introduced to destroy the plant, as suggested under "Depopulation of the *malnad*," and the obnoxious wild growing plant, now a nuisance to health and cultivation in the *malnad*, may be converted into a new source of income for a few years to come. **Lantana ash as a possible source of potash to prepare salt of manganese and chromium.**

If it be found economical to get the ash from the lantana plant, several other industries might be established in the Mysore district and in the *malnad*.

Preparation of potassium ferrocyanide.

The possibility and economy of the manufacture of Potassium Ferrocyanide, by utilising the hoofs, refuse horns, clippings of hides, etc., together with some iron might be investigated. Even saw dust is being utilised in this way in Europe.

Lantana ash as manure.

If none of these pay, then the lantana ash would be a very useful addition to the soil, wherever the plant is burnt or it might be mixed up with the ordinary farm yard manure.

Argentiferous Galena.

Short stringers of sulphide of lead known as galena occur near Kurubermardikere in the Chitaldurg taluk. It contains a good proportion of silver, assaying 134·65 ozs. of silver to the ton of lead ore and yields about 70 per cent of metallic lead.

The ore occurs as thin lenticular stringers from $\frac{3}{4}$" to $1\frac{1}{2}$" in thickness, and some prospecting work done has not disclosed the existence of decent quantities. But the work done was very meagre and more detailed attention is desirable. Traces of the same mineral are also noticed here and there in the direction of the run.

Antimony Ore.

Cervantite, an ore of antimony, occurs in small patches in a quartz reef on the south spur of the hill to the east of Chikkannanhalli, Chitaldrug taluk. Samples assayed 52·52 per cent of metallic antimony.

Some prospecting work done on this deposit did not disclose the existence of any commercial quantities.

More detailed work is necessary before a final verdict can be passed as to the economic importance of the ore.

Pyrites.

Crystals of iron pyrites, sulphide of iron, up to 3 inches cube were noticed in a cutting on the hill road from Attigundi to the Bababudan shrine.

Occurrence.

The chloritic schists of the Dharwar formation contain the crystals of pyrites in abundance. The schist composing the hills immediately to the north of the village Vuduvalli, Hiriyur taluk and in the Gonur block, north of Chitaldrug town contains the limonitep seudomorphs of pyrites in abundance. Similar occurrence is noted elsewhere in the run of the same schists.

Detailed prospecting to be undertaken.

Considering the importance of the mineral as a source of sulphuric acid, a detailed prospecting might be undertaken, both in the Bababudan areas and in the Dharwar schists, especially in the Chitaldrug district.

The question will have to be worked out, if it would pay to crush the fresher portions of the schists containing the unaltered pyrites and obtain the pyrites as a concentrate.

If successful, a small sulphuric acid plant might be set up at Marikanave, which is situated in the pyritiferous schists.

Importance of the manufacture.

Production of sulphuric acid is the starting point of all chemical industries and besides, the acid is extremely valuable to an agricultural country like Mysore, since cheap supply of artificial fertilizers will enhance production from land.

Bones can be had locally and also oil cakes.

Small quantities of apatite.

Apatite is noticed near Channarayapatna and Kadakola, but the quantities are too small for being utilised in the manufacture of mineral fertilisers.

Earth-soda.

This occurs as a thin white saline efflorescence over long narrow belts of moist land that run close and parallel to water margins of tanks and water courses, etc., in certain parts of the State, especially in the taluks of Hosdurga, Hiriyur and Challakere, and also in several villages round Mandya. Over 200 cart loads of soda cakes were being sent out of Mandya every year to Bangalore and Coorg.

Some old uses for earth-soda.

Purer forms were being prepared originally near Mattod and Anivala in the Hosdurga taluk, also in several villages round Mandya and used for making bangle glass. The difficulty of obtaining sufficient quantity of charcoal stood in the way of this small industry and most of them are now closed down, the glass required being got from places like Ambala in North India and from parts of the Madras Presidency.

Quantity available near Mandya.

Earth-soda from near Mandya yields about 56 per cent of sodium carbonate and 27 per cent of residue insoluble in water. The annual efflorescence along water edges of the deep water course near Chiranahalli, three miles to the east of Mandya, is a pure variety and it was formerly being used for making glass for bangles.

One cart load of washerman's *choulu chakke* weighs 60 maunds of 24 lbs. and is sold at Rs. 30 per cart load, that is, at 8 annas per maund, while at Coorg it fetches Rs. 1-12-0 per maund (local).

Bangle glass from local soda and cyanide dust—a possibility

Considering the abundance of supply of soda, not less than about 100 tons a year at Mandya alone, and also the abundance of quartz sand or cyanide dust in the Kolar Gold Fields, it would be worth while to make a serious trial to obtain a more or less impure kind of glass as well as coloured ones for glass bangles, provided the crushed quartz is available and at cheap rates.

The art of glass blowing, though of a very rude type, does not appear to be completely forgotten. Some of the Kumsi people are reported to be still capable of doing the work. This is a point for further enquiry.

A bangle factory at Shimoga or Benkipur.

Suggestion.—Would it pay to begin preparing bangle glass at Shimoga or Benkipur, with the local soda and the cyanide dust from the Kolar Gold Fields, or other sources of quartz is a question deserving of investigation. Fuel can be had cheap at both the places and water-supply is abundant. Both of them are Railway Stations, besides.

Earth-salt.

Earth-salt for electrolytic bleaching.

Earth-salt occurs in many parts of the State, more especially in the Chitaldrug district and round about Mandya. Only a few tons are being collected every year in each taluk. More detailed examination of the salt and soda areas might become necessary, if earth-salt be found advantageous for electrolytic bleaching.

Ochres.

Manufacture of paints.

Ochres, red and yellow, occur here and there in several parts of the schist area of the Province. The manufacture of paints is a very important industry. The [illegible] material required is clay, more or less coloured, and it is found in sufficiently large quantities. Shimoga and Benkipur would serve as good sites for any future works, owing to the abundance and cheapness of wood fuel and a large water supply.

Mica.

State of mica mining in Mysore.

India is an important source of mica in the world and Mysore might take a fair share by developing her mica resources. But until a home demand is created here by the establishment of industries employing electrical and other machinery,

export may continue, with further exploration for the mineral. Attempts at mica mining have not been quite successful in Mysore. The Bombay Mining Syndicate were developing the mica areas in the Seringapatam and Mandya taluks but the quantity of good mica available was not sufficient to pay expenses.

Work is now being carried on in two other blocks in the Yedatore and Hole-Narsipur taluks and 2,027 lbs. of mica were obtained to the end of 1911. Here also, flaws and imperfections have stood in the way of marketing a good proportion of the output.

Deposits are reported near Sringeri, French Rocks and Saligram, but the quantities available are not known.

Various uses of mica.

"Manufacture of mica board is said to be very profitable. The process of manufacture is simple. Mica after being split into very thin plates is built up in a form to the desired thickness, each piece being re-cemented with shellac. The block is then subjected to a pressure of 2,000 lbs: to the square inch and pressed to a definite thickness. It is next steamed and pressed in moulds to secure the desired shape and completed by hardening in a kiln. The manufacture of mica pulp, mica board and other mica compositions required by the trade is stated to yield very good profits on the capital invested." (The Mineral Industry, Vol. XI.)

Abrasives, Corundum and Garnet.

Emery wheels, sand paper.

The two important minerals used as abrasives, *viz.*, corundum and garnet occur in Mysore. We may grind the former and prepare emery wheels, etc., and the latter into the so-called sand paper used extensively in wood work such as for smoothening and finishing waggons, cars, etc., and in the boot and shoe trade, in smoothening and scouring heels and soles and lastly on brass or iron joints.

The various localities in the State where corundum occurs are all shown in the Geological and Mineral map of Mysore, Plate I.

Some localities for Corundum.

Out of these, there are five localities where the mineral is being collected under collecting licenses, *viz.*, Chamarajnagar, Malvalli, Maddagiri, Kortagere and Sidlaghatta. The work of collecting the mineral was recommenced since 1912 and during the first six months of 1912, over 1,265 cwts were made available. Kortagere and Sidlaghatta have together contributed over 80 per cent of this total quantity.

Indian corundum in America.

Some Indian corundum exported to the United States of America was sold at 8 to 10 cents per lb. or Rs. 3 per 10 lbs. (Page 17 Mineral Industry, Vol. XI.) India is one of the few countries of the world producing corundum and a good chance may therefore await those that think of trading in it, provided the competition of the artificial material *carborundum* does not stand much in the way.

Refractory minerals.

Refractory materials such as asbestos, magnesite, fire-clay and soapstone may be utilised and worked into fire bricks, fire proof paints, steam packings, such as asbestos mill boards varying from $\frac{1}{16}$th to $\frac{1}{4}$" in thickness and 40"×40", which are sold by the pound; as well as plaited rope and packing, quarter to one and a quarter inch. Fire bricks pressed into size 9"×4½"×2½" fetch good price and English fire clay fine ground is sold at Rs. 3-8-0 per cwt. or about Rs. 70 per ton.

Attempts might be made at preparing some of the fire proof paints locally.

Magnesite.

Occurrence of magnesite in Mysore

Deposits of magnesite occur near Kadakola, Mysore taluk and also near Mavinhalli. No information is available about quantities. Places of occurence are shown on Plate I.

Uses of Magnesite

Magnesite is calcined and used in the form of bricks or concrete; as a refactory lining for open hearth furnaces and converters in the steel industry; as a

lining for rotatory kilns used in the manufacture of portland cements; as a non-conducting covering for boilers and steam pipes to prevent loss of heat and more recently in electric furnace construction as a refractory material. It is also used in the manufacture of paper stock by the sulphite process. Greece is the chief country exporting magnesite to other countries. With the development of the iron and steel industry in India, the demand for magnesite will increase. Then other places will be sought after, besides the Chalk Hills of Salem and the areas in Mysore.

Epsom salt may be manufactured from the crude magnesite after utilising the carbonic acid for mineral waters.

Limestone.

This mineral occurs in two forms in Mysore, as grey crystalline marble and as nodular *Kunkur*. The grey marble deposits constituting hill masses are associated with the similar occurrences of hematite quartzite and other schists of the Dharwar formation, the development being most marked round about Marikanave and Kudirekanave, near Huliyar. The peculiar massive form of the deposits precludes the stones being quarried and utilised for flooring like the Cudappa slabs.

Grey massive crystalline.

Slabs not available.

They can be calcined for lime but this will be more expensive than kunker limestone for this purpose.

Their suitability for fluxes in electrical smelting of iron ore has been favourably reported upon by Dr. Smeeth, the State Geologist in Mysore.

Nodular *kunkur* occurs in several parts of the State, the best known being those near Mandya and Channapatna. Their mode of occurrence, mostly as float, renders an estimate of their quantity a difficult matter.

Kunkur.

The mineral now being collected from small pits round about Mandya and Yeliyur is utilised for local building purposes. Dr. Smeeth has examined these deposits and has preferred the crystalline form for fluxing purposes.

For purposes of manufacturing cement, neither form of limestone will be useful. The expense of breaking and calcining the crystalline form and want of uniformity in composition preclude its use for that purpose, while everything is uncertain about kunkur, quantity, uniformity of quality, etc.

Unsuitability for portland cement.

Soapstone and Talc.

The Indian knows only a few uses for soapstone. Small culinary vessels are made in India as well as pencils, toys, etc., but the European nations use it in a variety of ways, such as for vessels subjected to high temperature or to the action of corrosive liquids and gases, for fire bricks, for stoves, hearth stones, gas tips, and insulators for electrical conductors.

Uses of soap stone.

The quantity of soapstone available in the State is large enough to warrant detailed investigation and report.

Talc, the massive form of which is called soapstone, is used as a filler for paper, as a lubricant, a non-conductor of heat, electric insulator for foundry facings, for water proof wall plaster in bath rooms, for face powder, shoe powder, wax floors for dancing, gas tips and soap making. It is also used as an adulterant of graphite for lubrication. Best American material is pulverised and sold at Rs. 64 per ton at New York: (Mineral Industry, Vol. VI). This mineral occurs near Benkipur and Hosdurga and may be put to some of the uses mentioned above.

Uses of talc.

Kaolin or China Clay.

Deposits of kaolin or China clay occur in several parts of the State, associated either with gneisses, as at Melkote, Hindiganhal, Hoskote taluk and near White

Occurrence.

Field, or with the crystalline schists of the Dharwar age, as at Gazirigudda near Bhimasamudram, Kolahal and Guddadarangavanahalli, of the Chitaldrug taluk. Some deposits are also reported near Sringeri.

Quality and quantity not ascertained.

The quality of the clay occurring near Melkote is good, while the material found in the other parts is associated with impure varieties, tinged red or yellow, by the great pigment material in nature—iron in its oxidised or hydrated forms.

No work has been done on any of these deposits and hence no information is available regarding the quantity or average quality.

Study necessary

But the nature and extent of some of these deposits warrant a more detailed study, as the economic aspects of the mineral are very varied.

Uses of kaolin.

For example, these clays might be used as such, after being washed, dried and graded or they may be manufactured into articles or products of commercial value.

Filler for cloth or paper.

Washed Kaolin is used as a filler for cloth and about 2000 tons are being consumed annually by the cotton mills in Bombay and nearly half that quantity by those in Ahmedabad. All this is imported at about Rs. 50 per ton. China clay is also used as a filler for paper, although the demand in this field is less than in the former case.

China-ware.

China ware and porcelain are some of the articles manufactured therefrom.

*As a rule, the purest kaolins make the best China clays and a high percentage of silica, as in those of Melkote, does not detract from its value, provided the composition is uniform and the silica is in a finely divided state.

Steps suggested.

Some representative washed samples might be sent to Bombay and the potential commercial value ascertained.

Some more might be experimented upon for porcelain in the Porcelain Factory at Calcutta.

An officer—a Geologist by preference, might be deputed to study the local resources more in detail and also the market in Bombay and the Porcelain Factory in Calcutta.

There are other economic possibilities for China clay.

Other uses.

Ultramarine is manufactured therefrom as well as mineral paints with admistures of oxides of iron or manganese. Bath bricks require fine grained siliceous clay. Portland cement is also manufactured, although sedimentary clays are preferable for this purpose.

Manufacture of corundum wheels, floor and wall tiles is another use.

Stone ware clay.

Stonewares are prepared from a mixture of clays having for their ultimate composition 56·65 per cent of clay base, 37·45 of sandy matter, 4·44 of fluxing materials and the remainder being moisture.

Low grade buff burning clays are preferred for terra-cotta wares, while sewer pipes are manufactured from clays high in fluxes.

Site for manufacture.

The site for manufacture need not be at or near the quarries, as the cost of Kaolin is relatevely small in the cost of manufacture. Brittleness of the porcelain wares and the consequent heavy and elaborate packing required render it advisable to locate a Porcelain Factory near the likely large market, say Bangalore.

Asbestos.

Of the two varieties of asbestos used in the arts, only the less valuable form has been discovered in Mysore up to the present.

The Canadian or Italian varieties associated with serpentine and Dunite rocks do not occur in the State.

The mineral noticed in Mysore belongs to the amphibolite series and deposits have been found near Hole-Narsipur, Mayakonda. Mudigere, Modasosi, Yedegondanhalli, Hosdurga and Bangalore.

Of these, the mineral in Mudasosi and Hosdurga is good in quality, while that near Hole-Narsipur is decent in quantity. The occurrence near Bangalore might be experimented upon for preparing fire proof paints but the prospects of any large asbestos industry do not appear to be probable in Mysore.

Green Quartzite.

Schistose masses of quartz rock, coloured rich bluish green, occur near the west end of the Belvadi tank, Chikmagalur taluk. The village belongs to the Sringeri Jaghir.

About four or five years ago, a good demand was created for this mineral for decorative purposes and quantities were sold at rupee one per pound in weight. But the market soon fell.

The stone is admirably suited for being utilised as semiprecious and used for signet ring's, etc.,

A trial might be made to get these forms prepared and sent to the European and American markets.

Building Stones.

The ornamental building stones of Mysore are good enough to be sent to any part of the world, provided it will pay to do so, as much of it will have to be carted for some distance and then sent by rail for 300 miles or so before being shipped at Madras. The Indian Granite Company quarrying from the Pallavaram hills has created a market for the charnockite for building and for road metal.

The quantities of occurrence are large enough for commercial undertakings. It is a question for investigation and decision whether any use can be made of the stone sawing and planing plant in the Mysore Palace and blocks worked by any future exporter of the stones to places in or outside India.

Mining School:—A Suggestion.

Mysore with its extensive gold mines, old and new, appears to be more favourably situated for starting a school for imparting instruction in metalliferous mining, than any other locality in Southern India. Some of the old mines, like those at Ajjampur, might be utilised for instruction purposes or any similar ones in the Kolar Gold Fields.

The instruction might be of a preliminary character in the beginning.

Other Suggestions.

A class for Prospectors might also be opened in the Central College, Bangalore.

Mineral collection and sale of mineral and rock sets might be started as a new profession by a few of the Geology graduates of the Central College.

An illustrated Kannada Catalogue might be supplied with every set, for the numerous Schools in the State.

CHAPTER IV.

POWER RESOURCES.

The three main sources of power available for industrial operations in the State are :—

(1) Waterfalls.
(2) Fuels.
(3) Wind.

Nature of power resources in Mysore

Generally speaking, fuel resources may be solid, or liquid. There is no chance of finding coal in the Mysore State or of liquid fuels.

Wood fuel is abundant in the forest areas as well as in the numerous private casuarina and other plantations. Several water falls are reported to exist in the districts of Shimoga, Kadur, Hassan, Mysore and Bangalore.

Electric power developed and consumed

Some idea of the local demand for power may be gathered from a glance at Table XVI annexed hereto. The Sivasamudram Water Falls develop 11,800 H. P. on an average, out of which the Kolar Gold Fields consume about 9,586 H. P. Out of the remaining, the Binny Mills consume 642, the Belagola Pumping Station at Mysore 300, the Indian Institute of Science 129, the Railway Workshops 70, while the Filter beds consume 91, besides a few smaller consumers.

Some more electric power is generated by the Kolar Gold Fields Mines, the rated H. P. being 3,845 for 1911.

Thus 15,645, H. P. of electrical energy was being developed and consumed in the Mysore State at the end of 1911, besides the 3,770,248 K. W. hours for lighting in the Kolar Gold Fields.

Steam and oil power.

A considerable quantity of steam power is also developed in the Kolar Gold Fields as well as in the various workshops and other industrial establishments in the State. During the year 1911, the Kolar Gold Fields generated a maximum of 24,231 H. P. by steam, while the several other industrial establishments in the State required 2,601 H. P. by steam and 316 by oil or gas.

Total quantity of power developed and consumed

Inclusive of the several oil engines and four suction gas plants, the total H. P. developed by steam, electricity or oil engines in the State is not less than 43,000 H. P.

Assuming it possible to supply electrical energy to all those industrial establishments which are at present worked by steam or internal combustion engines, the amount of electrical power required would be about 43,000 H. P.

The power resources of the Kannambadi project.

The Kannambadi project will be able to meet a part of the demand from the Kolar Gold Fields and some of this power from the Cauvery Power Scheme would be available for industries likely to be started in Bangalore, Mysore or the Kolar Gold Fields and not at any intermediate point between the Falls and these three cities. For, any proposal to supply electrical energy to likely industries in tracts along which the high potential lines to Kolar, Bangalore and Mysore pass, would require the installation of additional and very costly transformer stations at the required points, so as to reduce the high potentials in transmission lines to suitable low ones for local distribution and the question is if the project likely to need the power would be able to show any decent return in the way for eanings.

Other sources.

In addition to the power actually being generated at the Sivasamudram falls and the prospective at Kannambadi, 1,000 more H. P. of electrical energy can be developed at Marikanave.

There are a few other waterfalls in the State, which require complete investigation as regards their power potentialities.

The most important of these is the famous Gersoppa or Jog falls caused by the Sharavati at the north-west corner of the Shimoga district leaping down a depth of about 900 feet. This has long been before Government and owing to some reason or another, the subject does not appear to have made much headway.

It is, however, one of the greatest sources of energy in the State, of a large potential value both to Mysore and to Bombay and deserves early consideration.

Varahi falls with about 120 feet drop is another in the Shimoga district, though much smaller than the Gersoppa. It is about 3 miles distant from the Hulikal T. B. on the Hydergharghat road.

Of the various other falls in the *malnad*, there is one at least which appears to have received a somewhat detailed consideration at the hands of experts, Dr. Smeeth, and the late Captain Dawes, both of whom have stated that there is room for a project to generate electric power by falling water by bounding up the Somavahini river near Malandur and conducting the water to Muttodi where a fall of 700′ can be secured and 5,000 H. P. generated.

Some more information is furnished by the Executive Engineer, Kadur, about this and about one or two others in the district. According to him, the Somavahini is a perennial stream with a flow of not less than 50 to 60′ per second even in summer. It has a rapid fall of 1,000′ in 7 miles between Malandur and Muttodi. During the monsoons, the stream discharges at least 10,000 c.ft. per second. A reservoir of about 600 units is possible at Malandur and another of about 500 units near Muttodi.

There is another perennial stream called *Anebiddahalla* running parallel to Vastara on the Koppa Road. It is stated to have a fall of 700′ to 800′ and in what distance is not given.

The Executive Engineer, Kadur, also states that there are four tanks in the district, having a head of 29, 61·50, 30 and 20 feet respectively, *viz.*, Vishnusamudra, Madag, Ayyankere and Belvadi, respectively and more detailed enquiries might be instituted in regard to these.

The Bhadra is a perennial river with a discharge of not less than 400 c.ft. per second and as a large reservoir as possible might be constructed at latitude 13°-41′, longitude 75°-38′.

Some power resources in the Hassan district.

In the Hassan district there are 2 dams, one across the Cauvery and the other across the Hemavati called Krishnarajakatte and Sriramdevarkatte respectively. The former is at Konanur in the Arkalgud taluk and the latter is about 4 miles from Hole-Narsipur. The falls are 15 to 20′ high in each case, but the Executive Engineer states that 20 to 30 H. P. could be produced even during the driest months of the year.

The Hemavathi is a perennial river and discharges more than 150 c.ft. per second even in summer and a reservoir is possible.

There are several streams in the Manjarabad ghat regions which are perennial, across some of which dams might be constructed to generate power, as the streams run along steep gradients. The District Forest Officer at Hassan states that there is a fall from 15′ to 50′ in the river known as Yettinahalla to the south of Maranhalli, on the Mangalore road and a few more in the ghats.

There is a water fall on the Nugu river in the Aynur Forest of the Mysore district. The fall is 16′ and the available power is estimated at 12 H. P.

Chunchanakatte in the Yedatore taluk is the name of a dam across the river Cauvery and the fall here is 60 to 80′ made up by a succession of cascades. **Mysore district.**

There is a waterfall in the Shimsha river near the Dhunga forest in the Malvalli taluk. Perhaps this is the famous Shimsha fall near Halagur with a drop of about 500′.

The Amildar of Kankanhalli informs me that there is a fall in that taluk of 30′ in height and this requires enquiry. **Bangalore district.**

There is another at the junction of the Arkavati with the Cauvery where the river is so narrow that it is usually known as *Mekedatu*, as a goat is supposed to cross the gorge.

The above constitute some of the various small waterfalls scattered in different parts of the State.

Wind is powerful enough in the several parts of the State for about 3 to 4 months in the year. The places noted are Ajjampur, Huliyar, Jagalur and banks of Tungabhadra near Harihar and Marikanave. **Wind.**

Suggestion.—One special officer might be deputed to study these and other power resources, and suggest how best they could be utilised consistent with the material resources available close at hand and also of capital.

Solid Fuel.

There are no deposits of coal in Mysore and the landlocked position of the State greatly enhances the cost of transporting coal from even the nearest Indian Coal Fields to the interior parts of the Province and as the cost of fuel is a very important item in all industrial undertakings worked by power, the question arises if other and cheaper resources in solid fuels are possible or available in the State. **Land-locked position of Mysore a serious disadvantage to supply coal.**

The extensive wood fuel assets of the 22 lakhs of acres of forests and especially of *malnad* and of the numerous plantations for casuarina in the Bangalore, Kolar and Tumkur districts constitute a very important source of power.

Next to water turbines, which are the most efficient machines that we posses and which convert fully 80 per cent of the energy supplied to them into useful work, internal combustion engines rank next, as their efficiency is fully 40 per cent, while the efficiency of the steam engine rarely exceeds 20 per cent.* If therefore, the local fuel resources, wood fuels, are to be utilised to the best possible advantage, suction gas plants will have to be introduced for industrial operations in the several parts of the State where wood fuel is abundant and close by. Such plants fed by wood charcoal have been working satisfactorily in the Mysore Tannery, Limited, and in the Benkipur Fruit Farm and it appears that even wood refuse and saw dust, etc., are being used in England to produce cheap power. It appears that most kinds of wood are used and that the troubles in efficient cleaning of the gas jets and the choking up of the gas pipe, valves etc., have been overcome. Several other advantages are ascribed to this plant, the most important of which is the small quantity of refuse wood consumed, *viz.*, 2½ to 3½ lbs. per brake-horse power. It is stated that the plant will produce approximately 4 to 5 times the power that could be generated by burning fuel for direct steam raising. **Comparative efficiency of the several kinds of power.** **Wood refuse and saw dust also used.**

The desirability or otherwise of introducing such a plant appears to be a point deserving of consideration. With wood as fuel, we may use also a steam engine, especially when the power required is considerable.

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* Natural sources of Power by R. S. Ball, Westminster Science Series.

Wood fuel

A list is given below of a few of the woods suited for fuel or for conversion into charcoal. The Botanical names of most of these are yet to be ascertained.

Abalu, Canthiium Umbellatum; *Achalu*; *Ackerakalu*; *Ambarala*, Terminalia chebula; *Antwala*, Sapinaus trifoliatus; *Basavanpad*, Bauhinia malabarica; *Bannadamara*; *Bage*, Albizzia procera; *Bangare*; *Bandrike*; Dondonaoa viscosa; *Bendebelal*; *Bettabasari*; *Bettadavare*; *Bondie*, Hibiscus esculontus; *Bilijali*, Acacia Leucopheasa; *Hunal*, *Hulve*, Terminalia paniculata; *Jambe* (Iron wood), Xxlia delabriformis; *Kalgutti*, Acacia catechu; *Kankuma*; *Matti*, Terminalia tomentosa; *Thapsi*, Holoptelea integrifolia.

According to the Conservator of Forests in Mysore, numerous kinds of wood suitable for being converted into charcoal occur in all the districts, at a value of one rupee per ton evidently at the forest site and that 50,000 tons have been the average annual consumption of such wood for the last 5 years. He is also of opinion that if required, a much greater supply would be available up to 2,00,000 of tons every year.

The European Foresters give an average of about a ton per acre per annum at about 12 years rotation, as the yield of wood from forests. In Madras, the annual yield from forests is reported to vary from ¼th to ½ ton per acre, from somewhat well reserved forests. Plantations yield from two tons per acre, with a greater cost. The Kamasamudra forests in the Kolar district, the Devarayanadurga Forests in the Tumkur district are shown to yield 2·7 tons and 1·16 tons per acre respectively over a period of 20 years, *i.e.*, the annual yield 0·13 and 0·058 tons respectively. But in the *malnad*, with about 70 to 80 inches of rain-fall and heavier wood jungle the yield ought to be much more.

Other resources in wood fuel.

Casuarina.—Besides the quantities given by the Conservator of Forests of firewood available from the forest area, there is another very important source in the form of possible large supplies—actual and potential—of casuarina wood from the various casuarina plantations in the districts of Bangalore, Kolar and Tumkur.

Production in a few localities.

A reference to statements of internal railborne trade given in Part III shows that Shimoga, Mysore and Tarikere are the most important seats of export of wood. This wood will include timber unwrought, fuel wood as well as sandalwood and they are all produced from the forests, whereas, the exports under wood from stations like Tykal to Krishnarajapuram consist almost entirely of casuarina, inasmuch as there are no timber trees in those areas and casuarina plantations are abundant. During the three years 1909 to 1911, quantities of fuel-wood varying from 2·75 to over 3 lakhs of Bengal maunds were sent out from the Stations Tykal to Krishnarajapuram, while the Stations Kengeri to Chennapatna supplied from 73 to 94,000 Bengal maunds—Dodkurgod to Yelahanka following next. Most of this traffic in wood is directed either towards Bangalore City or towards the Kolar Gold Fields.

A very large quantity of fuel-wood both casuarina, and others is being brought into Bangalore by carts from a distance of about 30 miles all round—Kankanhalli, Magadi, Devanhalli and other places.

Wood suitable for destructive Distillation.

The Conservator of Forests gives a list of four local varieties of wood as being suitable for destructive distillation, *viz.*, *Terminalia belerica*, *Boswellia serrata*, *Veteria indica* and *Albizzia lebbek*. No information is available regarding the quantities or distribution.

Destructive distillation of wood is one of the most important industries that ought to be started as it is likely to develop several others in its wake.

A steady and permanent supply of fuel in the form of charcoal or of bricquettes would become available, favouring industrial developments. With the possible profits from the by-products, charcoal might be sold at comparatively cheap rates and this would have the effect of increasing the demand for charcoal.

Mr. Chatterton, in his Industrial Evolution of India, has estimated that, with a capital of about Rs. 2 lakhs of rupees, 6,000 tons of casuarina-wood operated could yield products worth about Rs. 1,36,800; from which if Rs. 1,00,900 be deducted for expenses of charcoal, wood, repairs, management and depreciation, a net profit will still be left of about Rs. 35,900 per annum. In this calculation he has allowed Rs. 8 per ton of casuarina wood and, as the cost of this amounts to very nearly 50 per cent of the total working expenses, any considerable reduction therein would go to enhance the profits of the industry. This shows that it is very favourable indeed, to start one in Mysore since fuel including cartage could be had at about Rs. 4 to 6 per ton in most of the forests, where distillation works could be started, and assuming that the forest area is not more than 15 to 20 miles from the site of the works.

As against this likely decrease in the cost under wood, there is also an item of increase in the value of coal by the amount of railway-fare between Madras and Tarikere or Shimoga where distillation plant could be set up. But this increase is much smaller, being only Rs. 7,000 while the reduction in the fuel charges would be about Rs. 18,000 leaving still a balance of about Rs. 11,000 in favour of the annual balance of a wood distillation factory to be started in the forest areas of the State.

An extract is given below from "The Industrial Punjab" by Mr. Latifi, to show how such an industry is being worked in France, Germany, etc.

"The industry of the Dry Distillation* of wood has been highly developed in France, Germany, and the United States of Amercia, and the actual balance sheet of a German Factory will be of interest in the present inquiry. The stills are at work for three hundred days in the year and handle birch wood. One mark =12 annas.

Cost of production :—

	Marks.
Wood, 530,000 c.ft. (about 6,000 tons)	67,500
Coal, 900 tons at 15 marks	13,500
Lime, 150 tons at 15 marks	2,250
Labour, 8,400 shifts at 2·10 marks	17,640
Repairs	4,000
Packages	6,000
General (including management)	17,300
Marks ...	128,190

* The destructive distillation of wood may be taken to yield approximately :—

Charcoal	25 to 29 per cent
Water-free tar	5 ,,
Pyroligneous acid	1 ,,
Acetate of lime	6 ,,
Wood-spirit 80 per cent	2 ,,

Sales :—

				Marks.
Charcoal, 1,650 tons at 48 marks	...	...	...	74,250
Wood-spirit, 91·75 tons at 592·9 marks	...	...	...	54,450
Acetate of lime, 382 tons at 160 marks	...	...	...	61,120
Wood tar	...	...	...	7,500
		Marks	...	197,320
		,,	...	128,190
		Gross profit, Marks	...	69,130

Depreciations :—

				Marks.
1 per cent on land (9,000 marks)	...	...	...	90
2 per cent on buildings (60,000 marks)		...	...	1,000
12 per cent on plant (125,000 marks)	...	...	...	15,000
		Marks	...	16,090

Net profit, marks 53,120 per annum.

The capital of the factory is 184,000 marks, and the return amounts therefore to 35 per cent."

Forest area required. At an average of one ton of wood per acre of forest, the distillation plant requiring about 6,000 tons of wood per year would need a forest of about 10 square miles, and even if the plant be increased five fold so as to consume about 30,000 tons of wood yielding about 6,000 tons of charcoal every year, the area required would be nearly 50 square miles.

Some possible uses for charcoal. The cost of charcoal is an important item in the electric smelting of iron ore by the Stassano furnace, and if a saving could be effected under this head, smelting works would pay and then several other industries would spring up to manufacture the smelted steel into the various forms into which it may be worked. Even the quantity of 10,000 tons of steel per annum would be no small production for a beginning and a plant of this capacity requires nearly 3,500 tons of charcoal.

Other uses for charcoal. Another use for the charcoal, especially in a briquetted form, would be to replace the cow-dung cake, now being wasted as fuel instead of being used as manure.

The third important use would be to secure a great national efficiency in the form of increased leisure to Hindu ladies for domestic improvements.

The system of cooking by steam, especially with charcoal as fuel, stimulates and develops habits of system and of fore-thought and there is much saving of time. This would be very valuable indeed.

The ladies of the house-hold can attend to other more important items of work, such as, looking after their children or reading or increasing domestic economy in general.

Another use of the large supply of charcoal would be to generate electric power where charcoal is available in abundance and to transmit that power to places where it may be required, instead of carrying the bulky charcoal over long distances. If large quantities be manufactured, why not run very light electric tram-cars between important towns of the *malnad*?

I would therefore suggest that this scheme of wood distillation be taken up on hand, as one of the first practical schemes to be materialised, and in the very immediate future.

Present Method of preparing Charcoal.

The large quantity of charcoal supply needed by both the City and Cantonment of Bangalore is brought in mostly by carts from a distance of within thirty miles.

Both jungle wood and casuarina are utilised in the preparation of charcoal. The roots and knots of the casuarina are mostly converted into this form. At Devanhalli 14 cart loads of the wood are found to yield about two of charcoal of 32 bags each, of one and a half local maunds per bag. The 14 cart loads at Re. 1-4-0 per cart cost Rs. 17-8-0, charges for felling at Re. 0-4-6 per cart amount to Rs. 4, charges for splitting Rs. 4-6-0, besides Rs. 3-8-0 more for the twigs and small branches and Rs. 5 cart hire for two carts to Bangalore, making up a total of about Rs. 35; and the two cart loads of charcoal are sold in Bangalore for Rs. 38. A man spends about a week on this business and earns Rs. 3.

The people who are engaged in this work round about Devanhalli are all of them immigrants from Vellore who have practically settled down in those parts and pursue this calling. Similar supplies of charcoal are being received from parts of Closepet, Anekal and Kankanhalli taluks; also from Magadi and sometimes even from Kunigal.

Although the quantity of wood thus converted into charcoal every year is large enough to feed a factory for destructive distillation of wood, the scattered nature of the places where such conversion takes place, will not make the concern a profitable one. There is no doubt a considerable waste of the several products which could otherwise be collected and utilised.

Suggestion.—An enquiry might be started to ascertain, (1) whether a Wood Distillation Plant could be set up at a convenient centre in or near Bangalore so as to receive its supply of wood from the charcoal preparers and to give them back the charcoal and (2) whether the arrangement would be advantageous to both.

Casuarina is planted over hundreds of acres in Bangalore, Tumkur and Kolar districts in order to supply wood fuel for domestic consumption, for railway, mills water-works, &c., in and around Bangalore. The comparative small cost of cultivation not exceeding about Rs. 25 net per acre and the large yield of about Rs. 300 per acre in about 8 to 12 years have favoured the planting to a very large extent. It is no doubt true that the returns cannot be realised within 10 years at the minimum but as against this, there is the advantage of little or no attention being necessary to take care of the plant. The net income per acre is very nearly the same as that from, Ragi, but without all the trouble and expense.

Cocoanut Charcoal.

The hard shell of the cocoanut is now being wasted as fuel, either as shell or after conversion into charcoal. The compactness of structure secures a a greater heat-efficiency than in the case of many charcoals from ordinary wood. For this reason it is preferred by the iron and gold smiths who pay about a Rupee for one bag of about a maund and a half, and even Re. 1—2—0. All the forges in Tiptur, Chickkanayakanahalli, Chennarayapatna, Arsikere and surroundings use this material alone.

It appears that the shells from about 2,000 nuts give one bag and since 2,000 nuts form the yield from an acre, the charcoal value of every acre of cocoanut plantation is roughly Re. 1. At one and a half mds. per arcre, the quantity available round about Tiptur, would be 70,000 local maunds or 700 tons every year and this is sufficiently large for any enterprise.

Suggestion.—This charcoal is capable of being put to a more profitable use than at present either (1) for clarifying oils, or (2) for preparing printers' ink and I would suggest these two points being investigated.

Prospects of Capital for Industrial Enterprises and Preliminary work to be done.

As money resources constitute a form of power, a consideration of the prospects of raising money capital for industries falls naturally under this chapter.

Some conditions to be satisfied

Several conditions have to be satisfied or fulfilled before an industrial activity can dawn in an agricultural country like Mysore. A general realisation on the part of the people of the financial advantages of any particular industrial proposition over and above that of money—lending is perhaps the first essential requisite; secondly, the general population should be capable of partaking in such undertakings by contributing to the capital required therefor and thirdly, the people should have a general business experience, business habits and mutual confidence.

Here, in this chapter, we are concerned merely with the capacity of the people to contribute to the capital needed for industries.

People likely to supply capital.

For the purposes of raising money, we may group the people under the following four classes, *viz.*, merchants, money-lenders, officers and ryots. In the case of merchants, there are some whose capital is all locked up in their business and therefore it is not available. Some merchants who possess surplus money have lent them out at rates not less than 9 to 12 per cent interest. The City sowcar earns similar interest and he has no money for other investment. The village sowcar gets his usual rate of interest at not less than 24 per cent and he is quite satisfied with his investment. Most of the ryots, as they stand at present, have no money to spare for any industrial concern. On the other hand most of them are steeped in debts and are unable to meet both ends meet and it is hopeless to expect any money from a ryot until he betters his condition and a somewhat well-to-do ryot invests his money in gold, etc. The Government officer has some spare cash and he either deposits it in the Savings Bank or invests it in diamonds, gold and silver. He is, besides, perfectly innocent of the profit-potentialities of money, especially of any industrial undertaking. Most of the sixty and odd lakhs of rupees that are deposited in Government and other Savings Banks will not be available, because the depositors have not confidence in industrial undertakings for want of reliable and competent agency to help them in such underatkings and if some sort of assurance be forthcoming that the investment of money on industrial concerns would fetch decent returns, then capital will be available for starting industries.

It appears, therefore, that, for some time to come, all capital would be contributed mostly by the educated classes and, with their example, a few merchants and sowcars might follow.

Joint-Stock Companies should be the ideal.

If industrial concerns are to be started on a large scale so as to be able to be on a par with similar ones elsewhere they will have to be organised with a large capital and it is neither desirable nor possible for individuals to enter into fields like this. If Indians, as a nation, have to be benefitted by industrial undertakings, the money will have to be raised, in the form of a very great number of shares of small value each and this means that the ryot population must be capable of entering into such fields, which is perhaps a very distant prospect. So long as the ryot continues to be in his extremely indebted and illiterate condition, it is not possible to start any enterprising concerns on such lines. Beginnings will have to be made by syndicates or as partnership concerns. Joint Stock Companies must

Beginnings to be syndicates and partnership concerns.

certainly be the ideal to be constantly kept in view and this would be realised when the ryot is educated to higher ideals, economic, social and moral. It is extremely desirable that the profit or loss should not be concentrated in a few individuals, but should be distributed as widely as practicable. This more or less general partaking of the benefit accruing from industrial organisations has another advantage in its favour, *viz.*, of educating the people to the value of business undertakings in general and of making joint stock institutions more or less permanent and assume a national character.

Ryots condition to be bettered.

If this is to be kept in view, then attempts ought to be made to raise the condition of the ryot from his present indebted one. Once the ryot is free from his debts and what is more important, from his tendency to run into debt, then the sowcar's money will no longer fetch high rates of interest and will consequently be available for industrial enterprises. A time will come when new fields will have to be discovered in which this money will have to be utilised and then large industrial undertakings would become possible, the ground having been already prepared for it by diffusion of industrial and commercial information in the manner suggested elsewhere.

But how to bring about this millennium is a question. The subject for solution is a very vast one which will merely stagger the richest and the most benevolent of Governments. But the benefits likely to be derived from a realisation, however distant and far they may be, impel me to record what I wish might be done in this direction. It is simply this. Two spots in the State ought to be selected one in the *malnad* and another in the maidan for enquiring into all the liabilities or indebtedness of the ryots, with a view to Government doing something to lessen the evil, besides what is being done by encouraging co-operative effort in various directions.

Ryots to be improved socially and morally.

But one point which is very necessary to be impressed upon is that the ryot does not fall back into his old wasteful ways. Schemes now under contemplation of extending primary education will be most beneficial. Side by side with the movement to diffuse industrial information, there ought to be a diffusion of higher ideals of life, of temperament, of rectitude and fellow feeling and of other social and civil duties.

Technical Training.

Knowledge is power and technical training is systematised and practical knowledge in a special field. Beginnings have already been made in imparting practical mechanical training.

Industrial schools to be re-modelled.

Starting of Industrial Schools for training boys to special industries was already suggested under the various heads. I would now recommend the remodelling of the existing industrial schools in the State and equipping every one of them with a power worked set of machines and tools as in the Mission Industrial Schools at Tumkur and Kolar. Every such institution ought to have a class for carpentry, smithy, besides drawing and work in hides and skins. These should be common to all the industrial schools. Art-work might be introduced into some of them as in Bangalore and Mysore and manufacture of fly shuttles might also form a part of the work of a few others.

Sericulture might be introduced into Village Schools in the silk tract and special attention paid to the work of discriminating the healthy from diseased seeds.

Instruction in general principles and practice, of agriculture might also form one of the subjects.

The aim of most of these industrial schools ought to be to turn out fair carpenters and blacksmiths so that they might use their experience in preparing improved types of agricultural and other implements, as well as good village tanners and chucklers.

Deputation of students and officers to Foreign Countries to study Industry.

The student or officer that is sent out to Foreign Countries to study special industries must be made to undergo a course in such of the subjects as would be of immediate practical application to Mysore. The intending officer or student might therefore be made to study in complete detail, the local conditions and resources which pertain to the special line of work which is chosen and in which he proposes to undergo special practical training in Europe, America or Japan. This should be done before he is deputed. The student must have assured himself and satisfy Government that he would, on his return after the special training, engage himself in that line of work and in no other.

The Government should also satisfy themselves that there is room in the State for starting the industries proposed and that the intending student has capital at his back to begin work immediately after his return.

TABLE XVI.

* A preliminary list of Power-Worked Factories in the Mysore State, including those in the Civil and Military Station, Bangalore.

Serial No.	Name of Factory or Firm	Nature of Power used and Horse Power					Remarks
		Steam	Oil or Gas	Total	Electricity	Grand Total	
	I. INDUSTRIES OF FOOD AND DRINK.						
	Rice Mills—						
1	The Cauvery Rice Mill, Mysore ...	25	...	25	...	25	
2	The Krishna Rice Mill, Mysore ...	...	10½	10½	...	10½	
3	The Yedatore Rice Mill	6	...	6	...	6	
4	The Alur Rice Mill	12	...	12	...	12	
5	The Arsikere Rice Mill	12	...	12	...	12	
	Flour Mills—						
6	In the Maharaja's Mills, Bangalore ...	...	...	...	...	...	No separate power is taken for this.
7	Muniappa's Flour Mill, Bangalore ...	12	...	12	...	12	
8	Elgin Flour Mills	...	...	...	27	27	
	Sugar Mills—						
9	Goribidnur Sugar Factory ...	125	...	125	...	125	
10	Jaggery Factory, Oorgahalli ...	...	17	17	...	17	
11	Do Hudi ...	...	6½	6½	...	6½	
12	Do Agaram ...	...	6½	6½	...	6½	
13	Do Kadaba ...	...	8	8	...	8	
14	Do Haravu ...	...	12	12	...	12	
15	Do Kunigal ...	...	12	12	...	12	
16	Do Mavathur ...	...	12	12	...	12	
	Oil Mills—						
17	Mr. Ramachandra Rao, Scindia ...	...	...	...	4	4	
18	Messrs. B. Venkata Rao and Sajjan Rao	...	...	...	...	...	
19	Oil mill, Mysore	6	...	6	...	6	
20	The Arsikere, Oil Mill (rotary) 3 Screw Presses	...	...	...	...	...	Power from the Steam Engine in rice mill is used.
	Coffee Works—						
21	Messrs. Matheson & Co., Hunsur ...	...	...	...	...	...	
22	Coffee, rubber and cardamoms ...	...	...	...	...	...	
	Cigarette Factories—						
23	The City Tobacco Company, Bangalore	...	...	...	5¼	5¼	
24	The Tobacco Company, Bowringpet ...	7	4	11	...	11	
	Distillery—						
25	Government Distillery, Bangalore ...	50	...	50	...	50	
26	Mr. Janakiram Mudaliar's Brewery ...	...	...	...	3	3	
27	Mr. Evatt's do ...	...	...	...	3	3	

** This list is not complete since information is yet to be received for some (viz) 21, 22, 63 and 64; and the existence of a few more industries has been reported subsequently.*

Some were added to the list since chapter IV was printed and this causes the small diffrence in two figures and the correction will be embodied in the corrigenda.

TABLE XVI—*contd.*

Serial No.	Name of Factory or Firm	Nature of Power used and Horse Power					Remarks
		Steam	Oil or Gas	Total	Electricity	Grand Total	
	Water Supply—						
28	Kolar Gold Fields Water Supply Pumping Station, Bethamangala ...	413	...	413	...	413	
29	Ranivilasa Pumping Station at Belagola, Mysore	...	...	...	300	300	
30	Chamarajendra Pumping Station at Soldevanhalli, Bangalore ...	225	...	225	...	225	
31	Harihar Water Works, Harihar town	...	6½	6½	...	6½	
32	Krishnaraja Water Works, Shimoga town	25	...	25	...	25	
33	Combined Jewell Filters at Yesvantapur	...	42	42	42	84	
	Irrigation—						
34	The Mysore Fruit Syndicate, Bangalore	...	3½	3½	...	3½	
35	The Fruit Farm, Bangalore ...	...	32	32	...	32	Gas Plants.
36	Harihar Irrigation Works... ...	...	25	25	...	25	
37	Mr. V. S. Sambasiva Iyer's Pumping Plant	...	...	...	2½	2½	
	II. INDUSTRIES PERTAINING TO CLOTHING AND DRESS.						
	Cotton Ginning—Davangere						
38	S. S. Athani Hiremath and M. B. Murigendrappa	77	...	77	...	77	
39	Sri Mahalakshmi Ginning Factory ...	120	...	120	...	120	
40	Sri Basavesvara Ginning Factory ...	70	...	70	...	70	
41	M. Basattappa and R. Hanumanthappa	146	...	146	...	146	
42	R. Mahomed Hussan Miya ...	20	...	20	...	20	
43	Hiralal Manjanlal Factory, Davangere.	1	...	1	...	1	
44	Imam Sait	12	...	12	...	12	
	Cotton Pressing—						
45	Binny & Co., Davangere	20	...	20	...	20	
46	Gowhaji Nowraji & Co., Davangere ...	25	...	25	...	25	
	Cotton and Woollen Mills and Hosiery—						
47	The Mysore Spinning and Manufacturing Company, Bangalore ...	500	...	500	...	500	
48	The Mysore Wollen, Cotton and Silk Mills, Bangalore	470	...	470	900	1,370	
49	The Aryan Hosiery, Bangalore ...	...	9	9	...	9	
50	The Tinsel Factory, Bangalore ...	...	...	...	2½	2½	
51	The Mysore Tannery, Bangalore ...	...	28	28	...	28	Gas Plants.
	III. INDUSTRIES OF BUILDING AND CONSTRUCTION. *Saw Mills—*						
52	Mr. Hajee Ismail Sait's Saw mills, Kolar Gold Fields	...	...	...	30	30	
53	Toy Factory, Channapatna ...	...	6½	6½	...	6½	
54	Bangalore Saw mills	...	...	...	40	40	

TABLE XVI—*concld.*

Serial No.	Name of Factory or Firm	Nature of Power used and Horse Power					Remarks
		Steam	Oil or Gas	Total	Electricity	Grand Total	
	Tile Works—						
55	South Indian Industrials, Bangalore ...	125	2½	127½	...	127½	
	Workshops—						
56	The Railway Workshops M. and S. M. Ry. Bangalore	...	...	...	60	60	
57	P. W. D. Workshop at Bangalore ...	20	60	80	80	160	
58	Messrs. Rickie & Co., Bangalore ...	28	...	28	...	28	
59	Messrs. Mackenjie & Co., Workshops, Bangalore	...	...	...	9	9	
60	Imperial Service Transport, Bangalore	...	...	...	5	5	
61	The Industrial School, Kolar ...	...	12	12	...	12	
62	The Industrial School, Tumkur ...	...	6½	6½	...	6½	
63	Tramway Workshops, Shimoga ...	...	...	...	...	...	
64	Electric Power and Light Works, Mysore, Bangalore and Kolar ...	...	...	...	...	...	
65	Hydro Electric Works, Sivasamudram, Mysore	...	...	...	...	...	Generate power.
	IV. MINING.						
66	Kolar Gold Fields	24,231	...	24,231	3,845	28,076	Electric power developed by the Companies.
67	Do	...	...	...	9,586	...	Electric power supplied by the Mysore Govt.
	V. MISCELLANEOUS.						
68	Government Press, Bangalore	...	4½	4½	15	19½	Oil.
69	Branch Press, Mysore	...	...	...	3	3	
70	V. Krishnaiya's, Book Depot Press ...	...	...	...	2	2	
71	Wesleyan Mission Press, Mysore ...	...	...	...	4	4	
72	Indian Institute of Science, Bangalore.	...	...	...	129	129	
73	Central College, Bangalore ...	...	...	...	17½	17½	
74	Govt. Telegraph Office, Bangalore ...	...	...	...	2	2	
75	Motor house, Bangalore ...	...	...	...	½	½	
76	Manure Mills, Hunsur, Mysore ...	75	...	75	...	75	

CHAPTER V.

PRICES, LABOUR AND WAGES.

Prices.

The Director of Statistics in Mysore published in 1906 detailed statements and graphs showing the average annual retail prices of five principal food grains and salt up to 1905. **Previous work.**

The period covered was 45 years in the case of Bangalore and Mysore and 20 years in the case of other districts. **Period covered.**

That publication also contained statements of the average fortnightly prices that prevailed in the districts for 20 years, 1886-1905; the variations in the quinquennial averages for Bangalore and Mysore for 45 years from 1861 to 1905, those for 1871-75 being represented by 100; and the variations in the annual averages for all the districts for 20 years, 1886-1905, the prices of 1886 being represented by 100. **State-ments.**

There were nine plates of graphs, eight for the eight districts for some of the more important local food grains and one for salt for the whole State. **Graphs.**

For the purposes of this report, some of the figures given in that publication have been utilised and also those contained in the Agricultural Statistics for the State since 1905, which served to bring the information up to 1911. Tabular statements XVII—XXII are prepared showing the variations in the quinquennial average prices of rice, 2nd sort, ragi, cholam, Bengal gram and salt, for 26 years, from 1886 to 1911. **Brought up to 1910-11.** **State-ments prepared.**

The first statement gives the comparative prices for the five articles for the whole State, while the other five contain similar figures for the same articles, districtwar.

The average price of each article for the whole State for the quinquennial period 1886-90 is taken as 100, for all the statements.

Six plates of graphs, VII to XII, have been prepared embodying the statistical information about prices given in the six statements. A perusal of these statements and graphs brings out a few points for note. **And Graphs.**

Prices of the food grains—rice, ragi, cholam and Bengal gram have been increasing, except in the fourth quinquennial period, when a general fall is observable. **Rise of prices of food grains.**

The increase is greatest in the case of cholam and ragi, those for rice and Bengal gram following next.

Figures in Table XVII show that the retail price of cholam increased to 262 per cent of what it was in the quinquennial period 1886-90; of ragi to 250 per cent; of rice to 165 per cent and chenna to 153 per cent.

The price of salt decreased to nearly 61 per cent.

The average of increase in the prices of all the four food grains and salt during the period of 26 years works to about 1·8 times what it was in the first quinquennial period, 1886-90.

The prices of salt have been on the decline from the 2nd quinquennial period. **Fall in price of salt.**

The purchasing capacity of money so far as these articles are concerned has correspondingly diminished, necessitating a rise in the wages by that proportion.

Variations in price of other articles.

For variations in the wholesale prices of these and of all articles of merchandise, reference may be made to the returns of railborne trade, Part III, Trade and Commerce, which give the quantities and values of such articles.

Labour.

Some idea of the labour force required by and utilised in the Mysore State can be had from a perusal of the Special Industrial Census of Mysore published at the end of Part II of the Mysore Census Report for 1911.

Labourers not included in the special industrial census.

As explained therein, the statistics do not include figures relating to all those industries in the State in which less than 20 persons are employed and the labour force engaged in these minor establishments would be considerable in number.

For example the several tanneries of Jeevanhalli, Nagavara and Kadugondanahalli near Bangalore are not in the list with the hundreds of skilled and unskilled labourers working therein, since all the tanners have evidently underrated the number of persons working under them.

If the sugarcane crushers and jaggery boilers who work in batches of much less than 20 in each batch are to be included, then their number would be about 6,000—7,000 corresponding to the 40,000 acres of cane.

The five thousand and odd coolies employed in the Kannambadi works fall outside these figures, and also those in the cities of Bangalore and Mysore employed by the Municipalities, by the building contractors, etc. The local agricultural labour enumerated under *Farm servants* and *Field labourers* is also not included.

The labour force available in the Mysore State is not enough to develop the local resources to the fullest possible extent.

Local labour insufficient.

The census figures show that during the decade ended 1910, nearly 69,000 persons came into the Mysore State over and above those that went out. According to the Mysore Industrial Census referred to above, 55,176 persons are engaged as labourers, skilled or unskilled, in the various industrial establishments in the State, employing not less than 20 persons each and excluding the Civil and Military Station, Bangalore and including the 474 European and Anglo-Indian skilled labourers or 54,702 excluding these.

The balance of about 14,000 persons left out of the 69,000 who immigrated into Mysore might be taken to represent mainly the labour force absorbed in the various industrial establishments employing less than 20 persons and also these in the Civil and Military Station, Bangalore.

Distribution of labour.

Out of the 55,176 labourers skilled and unskilled employed in the larger industrial establishments, about 24,300 work in the Kolar Gold Mines and 25,255 in the plantations of coffee, rubber and cardamoms or about 50,000 in round numbers between these two industries. The two mills in Bangalore rank next, employing a total of about 1,850 persons. The Manganese Mines of Shimoga engage about 525 persons, the Hydro-electric works 418, the railway workshops, iron foundries and others following in order. Most, if not the whole, of the labour employed in the planting and gold mining industries is from outside the State, as well as that in the mills, foundries, railway workshops, etc.

Outside labour.

Sources.

Almost all those employed in the Kolar Gold Fields are from parts of Vellore, Arcot, Malabar and other places in the bordering British districts, while the planting industry depends mainly upon South Canara for its chief labour supply.

Wages.

Consequent upon the increasing demand for labour for fisheries in South Canara, and for tea and rubber in Travancore, Ceylon and the Straits and due to the general increase in the prices of food grains and other articles, the largest employers

of labour in the Mysore State, *viz.*, the coffee planters and the garden cultivators of the *malnad* are finding it difficult to get their required supply consistent with economy. **Labour difficulty.**

The South Canara labour is either supplied by cooly contractors called *shervagars* or the labourers themselves get directly employed. The *shervagar* is usually advanced money without interest up to about Rs. 200. He is to supply cooly to the extent required and get commission of Rs. 10 on every Rs. 100 worth of work turned out by the coolies. **A system of recruiting labour**

The wages of the South Canara coolies have very much increased during the last 10 or 12 years. About 12 years ago 40 persons were supplied for Rs. 4-0-0 and condiments, while five years ago only 32 persons were thus supplied and now more than 24 cannot be got. In some parts of the Nagar taluk coolies are not available at even 18 persons for one *varaha*. These rates work to about 0-3-3, 0-3-10 and 0-5-6 respectively during these years. This increase is considerable and it has been very seriously affecting the coffee planter and the *malnad* ryot. **Increase of wages.** **Planting industry.**

The gold mining companies of Kolar who form the second greatest employers of labour are, perhaps, not very materially affected by the changes in the labour market, since their general rate of wages is much higher. **Gold mines.**

There were, on an average, 27,701 persons employed in gold mining in Kolar during the first half of the decade ended 1910-11 and 31,772 during the next and they earned average annual wages of £4,56,143 and £5,37,045 respectively or £16·5 and £16·9 per head per year equivalent to Rs. 20·6 and 21·1 per month or an increase of about 2½ per cent during the decade. These figures are only of a theoretical interest since the number includes about 350 European and Eurasian skilled workmen who earn much more than the Indians.

The mill industry in Bangalore and the building and other minor ones in the two premier cities of the State are feeling the pinch much more than the gold mines. The mills pay Rs. 8-0-0 to 8-8-0 per mensem to adult males and Rs. 2-12-0 to Rs. 3-8-0 to boys and girls, for half time. **Mill industry.**

The manganese mines near Shimoga raised the wages from annas 8 up to Re. 1-8-0 for skilled workmen since 1906-07, while. general labour was paid from annas 4 to annas 6. **Manganese mines.**

The wages of a general cooly have risen to annas 5 for adult males from annas 4 about 10 years ago and this is the case near large towns where there was scope for other employment. **General.**

The wages of agricultural coolies are regulated by custom but as most of them receive grains besides being fed during harvest, they do not demand higher money wages. **Agricultural.**

The whole subject of prices, labour and wages is a very important one, besides being complicated. A detailed study might be undertaken along with the other equally important subject of the Economic Condition of the Ryot and of the Artisan.

TABLE XVII.

Showing the variations in the average quinquennial prices of four important food grains and salt during the 26 years, 1886-1911, expressed in terms of that of the first period 1886-90, taken as 100.

Name of article	1886–90	1891–95	1896–00	1901–05	1906–11
Rice (2nd sort)	100	134·4	141·4	130·4	165·3
Ragi	100	137·9	174·5	159·1	250·2
Cholam	100	145·6	180·1	161·4	262·1
Bengal gram	100	120·1	138·2	127·2	152·9
Salt	100	100·3	94·9	86·9	60·7

TABLE XVIII.

Showing the variations in the average quinquennial prices of rice, 2nd sort, in the 8 districts of the Mysore State, during the 26 years 1886 to 1911, expressed in terms of the average for the whole State for 1886-90, taken as 100.

Name of District	1886–90	1891–95	1896–00	1901–05	1906–11
Bangalore	128·5	161·0	158·3	159·7	176·3
Kolar	101·2	133·6	151·6	145·7	181·3
Tumkur	104·6	141·6	151·2	147·4	172·3
Mysore	114·1	148·9	148·7	126·4	163·7
Hassan	95·4	138·5	139·8	127·2	160·6
Shimoga	90·2	113·1	123·4	106·8	152·6
Kadur	79·8	124·5	130·2	132·4	147·9
Chitaldrug	101·8	125·7	135·7	128·1	173·6
Average for the whole State ...	100	134·4	141·4	130·4	165·3

TABLE XIX.

Showing the variations in the average quinquennial prices of Ragi in the 8 districts of the Mysore State, during the 26 years 1886 to1911, expressed in terms of the average for the whole State for 1886-90, taken as 100.

Name of District	1886—90	1891—95	1896—00	1901—05	1906—11
Bangalore	119·5	158·6	197·7	175·8	280·8
Kolar	99·4	150·4	182·3	175·5	281·0
Tumkur	88·5	138·8	163·9	155·5	251·9
Mysore	124.2	167·3	206·2	177·2	264·0
Hassan	94·3	130·6	168·9	157·2	240·3
Shimoga	90·4	123·1	155·5	129·7	221·6
Kadur	97·1	146·8	186·0	159·0	240·5
Chitaldrug	96·9	107·8	150·2	154·9	228·4
Average for the whole State ...	100	137·9	174·5	159·1	250·2

TABLE XX.

Showing the variations in the average quinquennial prices of Cholam in the 8 districts of the Mysore State, during the 26 years 1886 to 1911, expressed in terms of the average for the whole State for 1886-90, taken as 100.

Name of District	1886—90	1891—95	1896—00	1901—05	1906—11
Bangalore	142·6	165·7	197·0	150·4	260·0
Kolar	124·5	179·2	201·8	...	316·0
Tumkur	106·5	161·4	176·8	182·7	202·7
Mysore	98·7	141·0	162·4	136·1	225·3
Hassan	71·5	183·5	218·4	286·0	...
Shimoga	105·1	131·6	165·4	144·5	213·1
Kadur	...	122·5	189·0	146·5	220·9
Chitaldrug	83·3	113·0	150·0	149·9	202·9
Average for the whole State ...	100	145·6	180·1	161·4	262·1

TABLE XXI.

Showing the variations in the average quinquennial prices of Bengal Gram in the 8 districts of the Mysore State, during the 26 years 1886 to 1911, expressed in terms of the average for the whole State for 1886-1890, taken as 100.

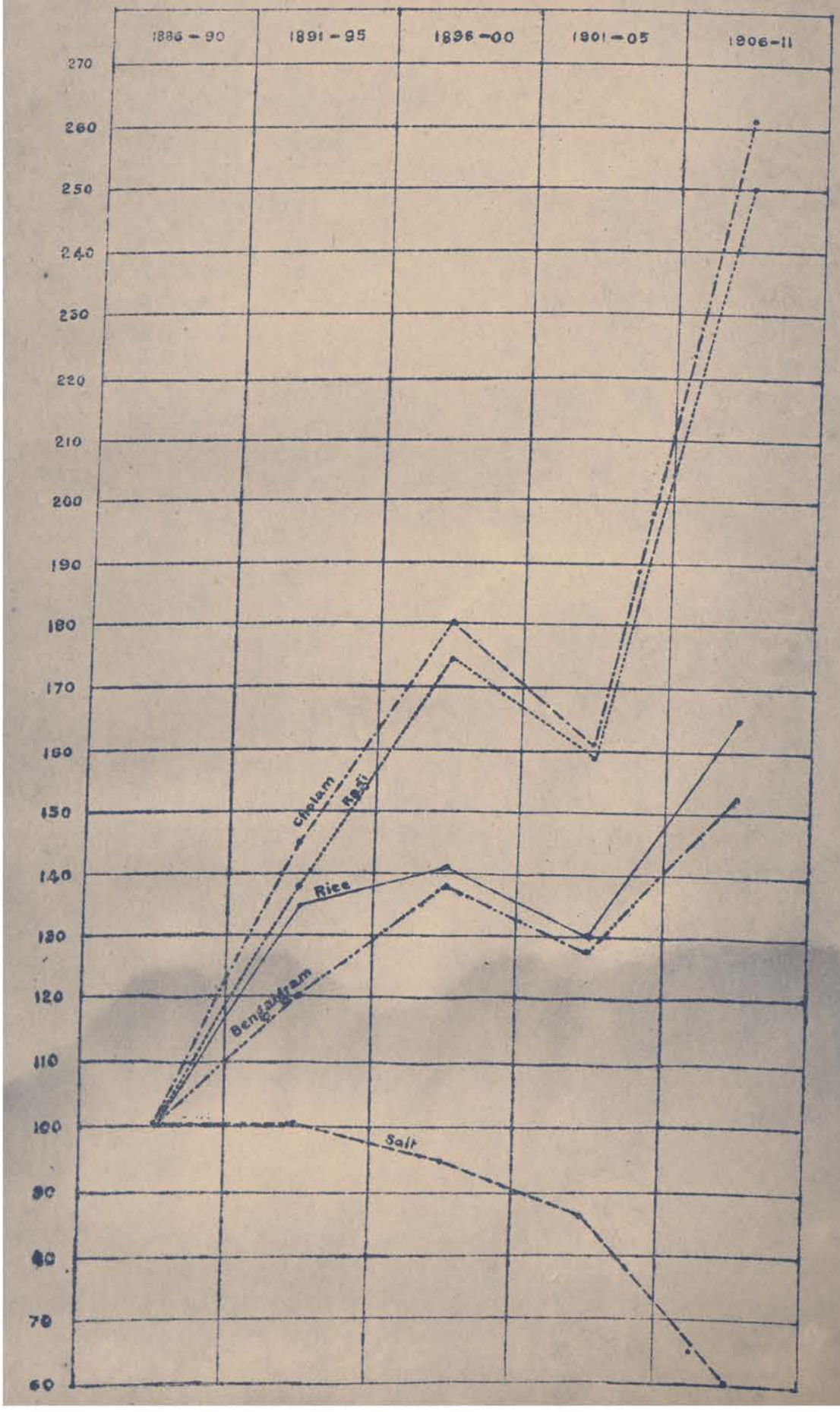
Name of District	1886—90	1891—95	1896—00	1901—05	1906—11
Bangalore	107·7	118·9	136·9	120·4	142·6
Kolar	109·3	135·3	158·0	132·0	148·4
Tumkur	102·6	121·1	142·7	138·2	160·0
Mysore	104·9	121·3	137·8	121·3	146·7
Hassan	103·0	127·8	142·9	131·1	155·6
Shimoga	89·7	110·8	123·4	117·1	155·4
Kadur	92·1	124·3	143·8	133·6	155·5
Chitaldrug	94·1	106·9	125·9	127·2	160·6
Average for the whole State ...	100	120·1	138·2	127·2	152·9

TABLE XXII.

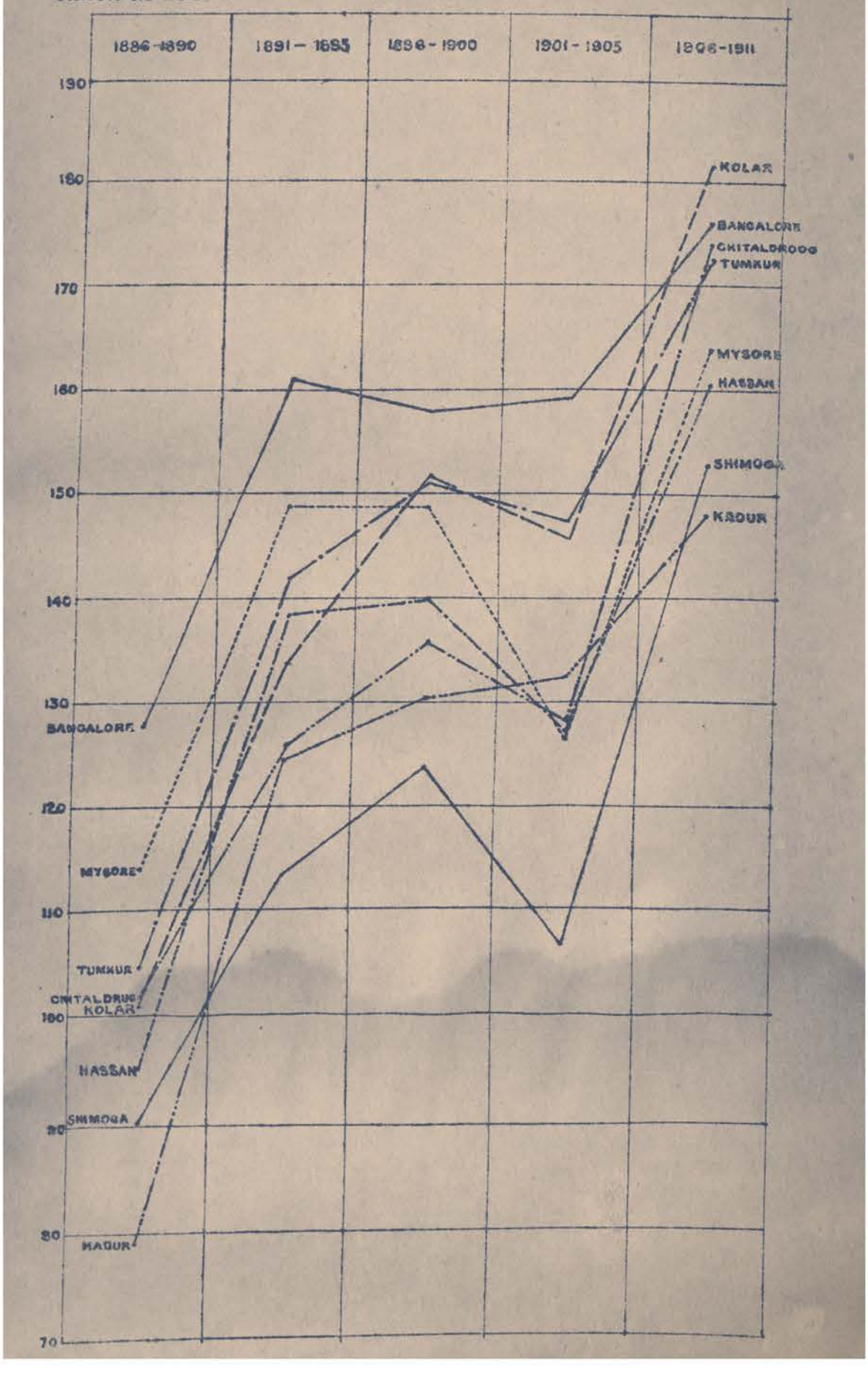
Showing the variations in the average quinquennial prices of Salt in the 8 districts of the Mysore State, during the 26 years 1886 to 1911, expressed in terms of the average for the whole State for 1886-1890, taken as 100.

Name of District	1886—90	1891—95	1896—00	1901—05	1906—11
Bangalore	93·6	95·6	90·3	78·3	57·1
Kolar	96·6	98·0	95·9	88·1	56·0
Tumkur	99·4	96·6	93·2	88·6	60·2
Mysore	103·3	96·7	89·7	79·4	58·1
Hassan	105·4	111·6	102·4	93·6	62·6
Shimoga	99·4	93·8	90·7	78·6	57·3
Kadur	98·5	107·3	102·3	92·4	58·3
Chitaldrug	103·8	105·4	106·7	100·5	82·2
Average for the whole State ...	100	100·3	94·9	86·9	60·7

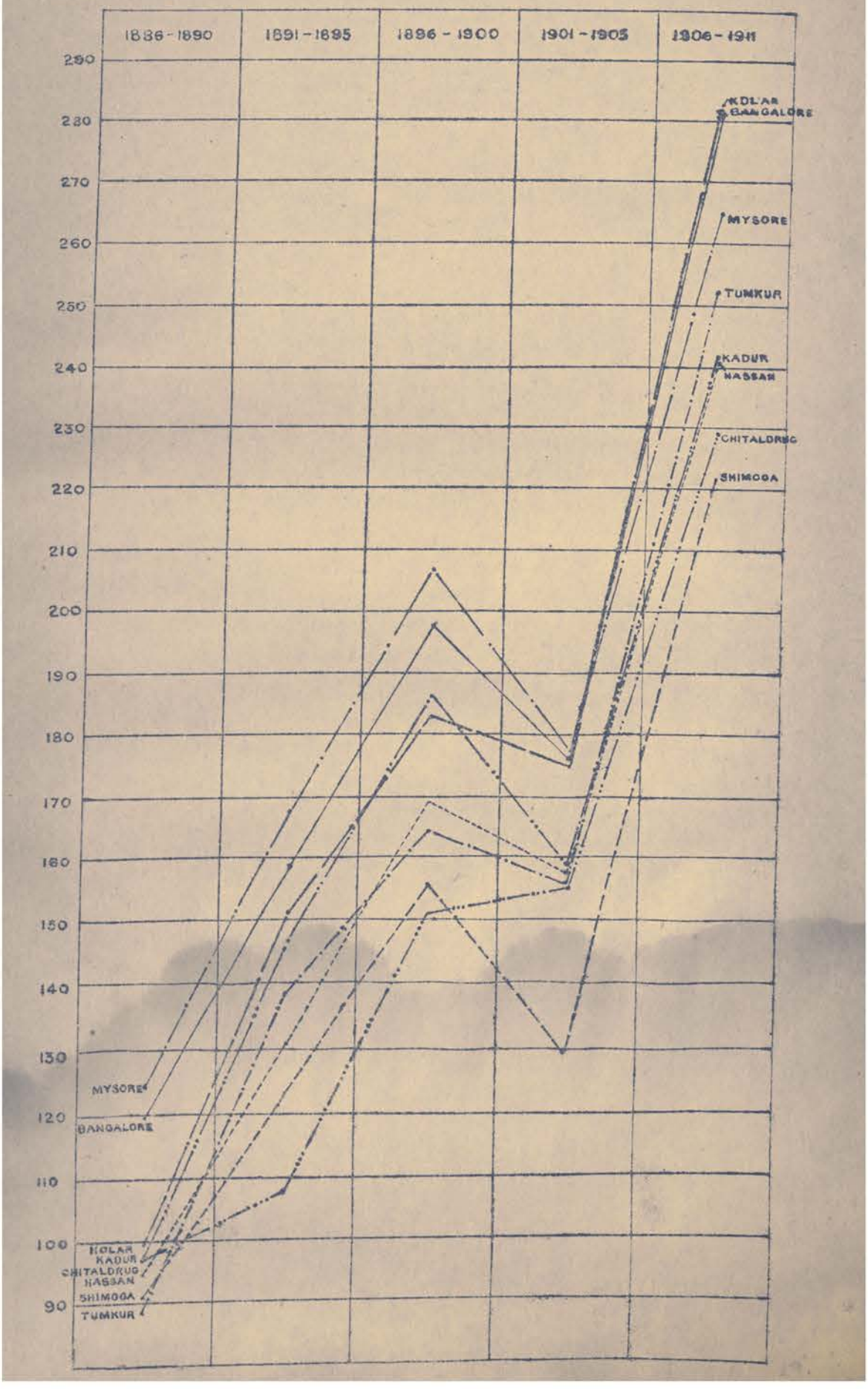
Graph showing the variations in the average quinquennial prices of four important grains and salt, during the 26 years 1886-1911, expressed in terms of that of the first period 1886-90 taken as 100.



Graph showing the variations in the average quinquennial prices of Rice, 2nd sort, in the eight districts, during the 25 years, 1886 to 1911, expressed in terms of the average for the whole State for 1886-1890, taken as 100.

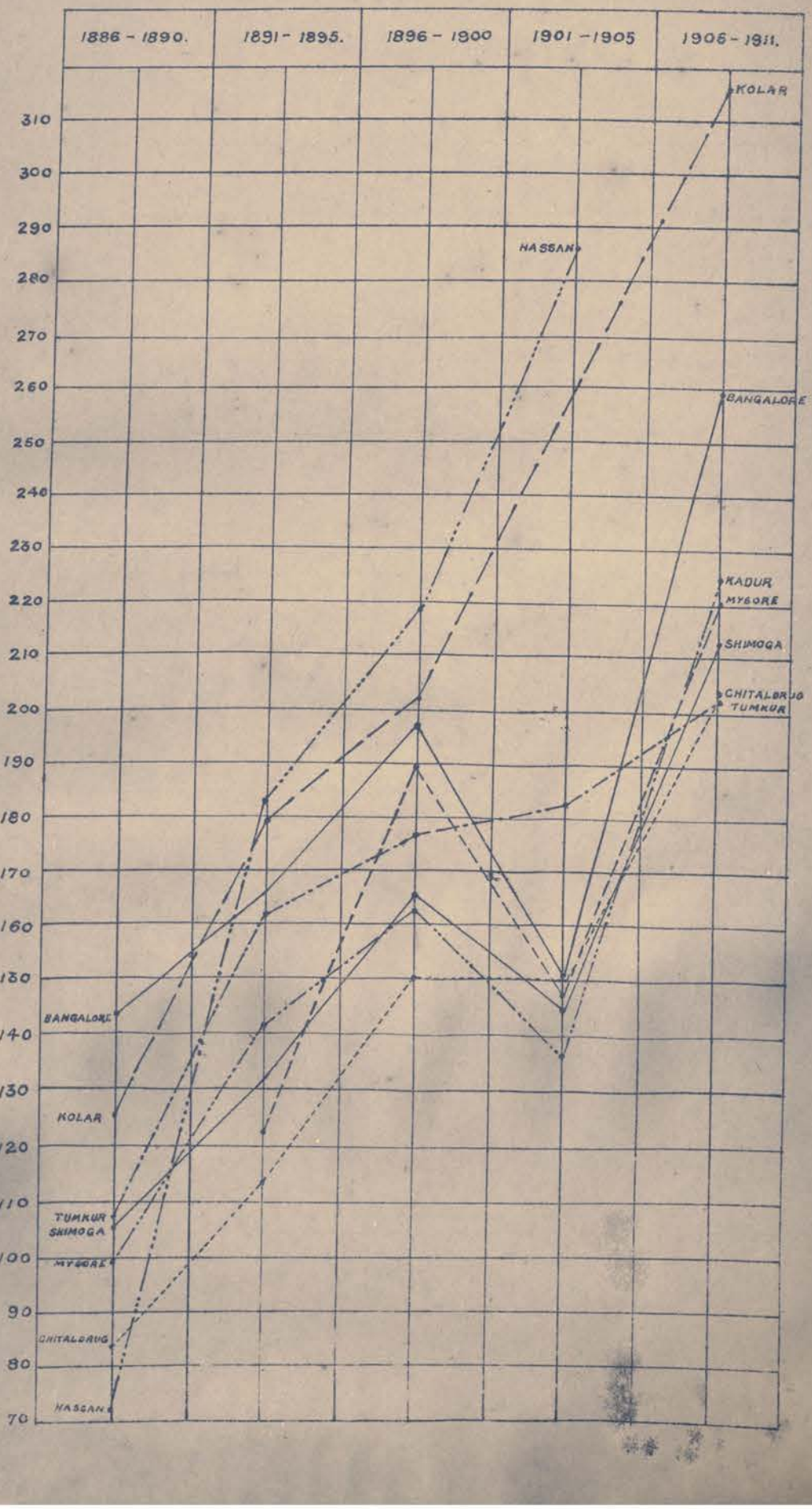


Graph showing the variations in the average quinquennial prices of Ragi in the eight districts, during the 26 years, 1886 to 1911, expressed in terms of the average for the whole State for 1886-1890, taken as 100.

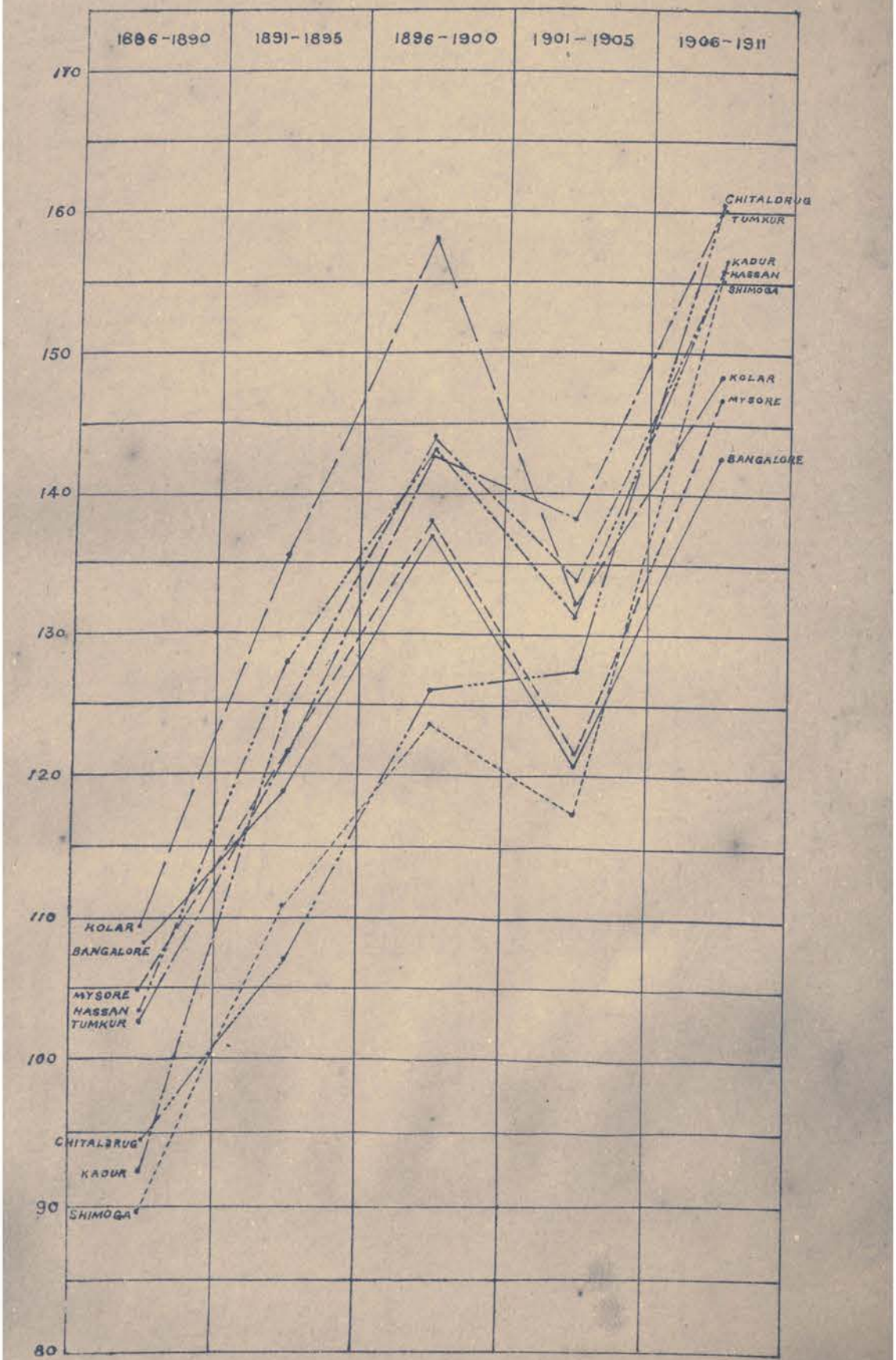


Graph showing the variations in the average quinquennial prices of Cholum in the eight districts, during the 26 years, 1886 to 1911, expressed in terms of the average for the whole State 1886-1890, taken as 100.

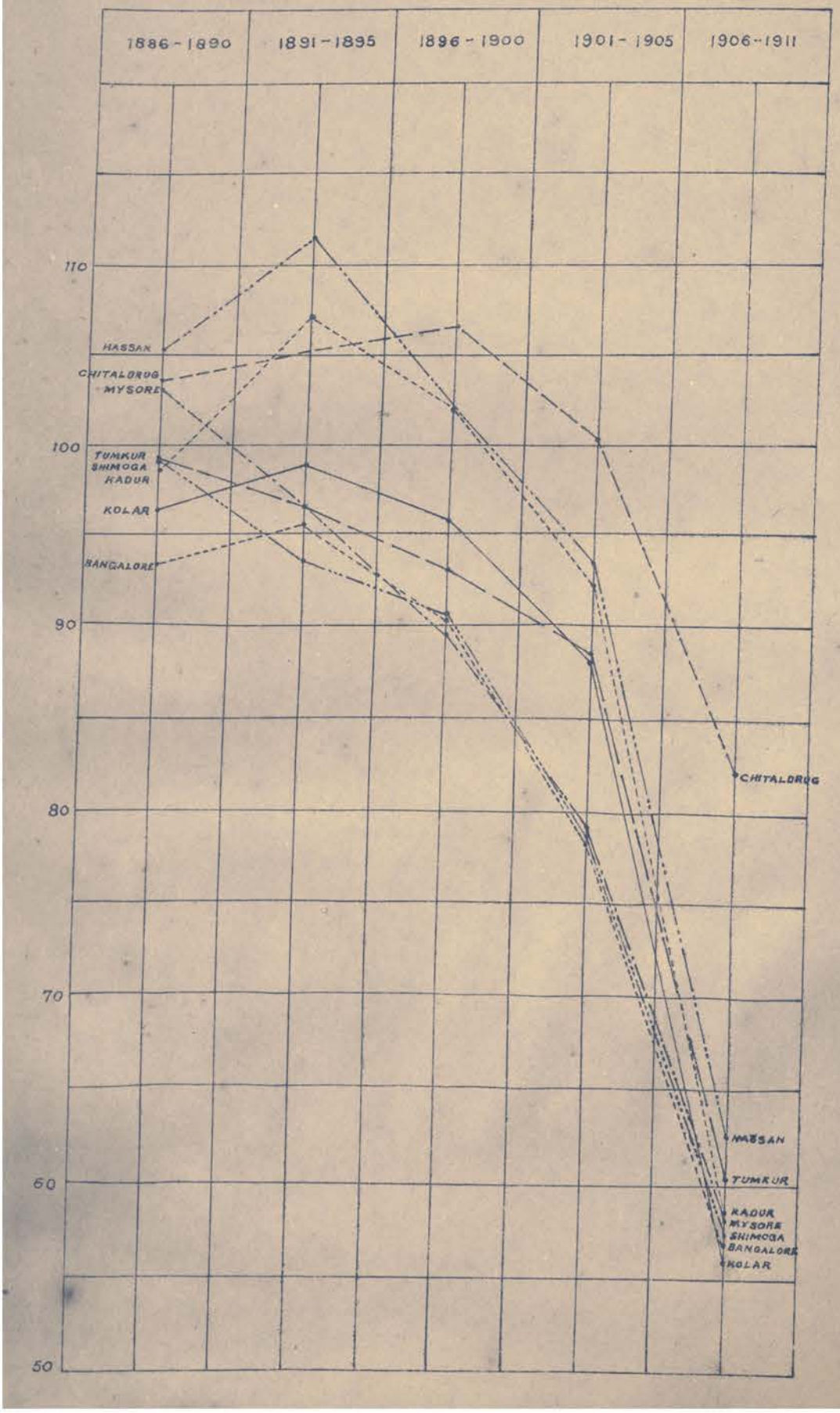
The prices are not given for the Kolar District for 1901-05; for the Hassan District for 1906-11 and for the Kadur District for 1886-90.



Graph showing the variations in the average quinquennial prices of Bengal-gram in the eight districts, during the 25 years, 1886 to 1911, expressed in terms of the average for the whole State for 1886-1890, taken as 100.



Graph showing the variations in the average quinquennial prices of Salt in the eight districts, during the 25 years, 1886 to 1911, expressed in terms of the average for the whole State for 1886-1890, taken as 100.



CHAPTER VI.

A GLIMPSE INTO THE ECONOMIC CONDITION OF CERTAIN SECTIONS.

The brief preliminary sketch of the production and consumption of articles of food and clothing of the people of Mysore given in Chapter I touched on a part of a more comprehensive enquiry into their general economic condition, as a whole.

In this Chapter, it is proposed to outline a few such points as affecting special sections of the population, (*viz.*,) some of the artisans and the *malnad* ryot.

Some of the Artisans and others.

The Weaver in Cotton and Silk.

The handloom weaver in cotton and silk plys his trade in one of three capacities. He owns the loom, buys his own yarn and sells the fabrics prepared at his own convenience and risk. He may be styled an owner weaver. **Owner-weaver.**

The weaver also works on contract. The loom may belong to him or to his employer but the yarn and fabrics belong to his employer, the sowcar, and the weaver is paid on the quantity of his work, either by cubits or by *hatchadas* of 36 cubits each generally, and has no further responsibilities. This is contract weaving. **Cotract-weaver.**

Thirdly, he is merely a skilled labourer who is paid his daily wages. **Cooly weaver.**

Most of the weavers are in debt and the amounts vary up to Rs. 100 and occasionally more. The first two generally own houses, while the wage earning cooly is, in several cases, homeless and propertyless. **Weavers indebted. Many property-less.**

As regards earnings, the owner weaver is slightly better off than the contract weaver and the cooly weaver fares the worst. **Comparative earnings.**

The cooly weaver gets his wages from annas 4 to 8 per day, according to the nature of his work and earns from Rs. 7-8-0 to Rs. 15 per month at the maximum. But his general intemperate habits drain away a good proportion of his income and, as a net result, he is not much better off than an ordinary unskilled labourer. Attempts at improving his lot are attended with greater difficulties than in the case of others. **Cooly weaver's income.**

The contract weaver, paid by cubits, earns amounts varying according to his rapidity and dexterity in work, from half an anna to two annas per cubit and weaves from 4 to 8 cubits per day and thus earns daily from annas 2 in the case of boys to annas 8 or even rupee one in the case of adults weaving costly cloths. This latter is very exceptional and the average income does not much exceed Rs. 4½ to Rs. 9½ per month. **Income of contract weaver.**

Paid by *hatchadas*, the contract weaver earns from Re. 1 to Rs. 2½ in 4 to 8 days, the maximun monthly income amounting to Rs. 18/12. But the average income is slightly greater than in the case of the other contract weaver.

The owner weaver occupies a respectable position in society and his earnings depend upon his skill and money resources. He buys yarn on credit from the dealer and, in this case, has to pay more for the yarn than when he purchases it in cash and the difference per bundle of 10 lbs. varies with the locality, as well as with the counts and colour of the yarn purchased and ranges from annas 4 as at Kallur, Hole-Narasipur, Melkote, etc., to annas 12 as at Magadi. Another avoidable **That of owner weaver.**

source of loss is that the dealer supplying yarn on credit also stipulates the sale of the cloth to himself and at annas 4 less per *hatchada* than the market rates. The owner weaver thus loses from Re. 1 to Rs. 2 per month under this head.

Sources of avoidable loss.

The weaver buying his yarn is also at some disadvantage in other ways. He is often duped in the purchase of coloured yarn as the difference in price varies by Rs. 2 and more for the same colour and count of yarn but of different degrees of fastness.

There is yet another avoidable source of loss. Some unscrupulous dealers sell yarn of the next higher count for one of the lower as was done at Grama once, and pocket the number of hanks, equal to the difference between those in the bundles of different counts.

Mulberry Grower, Cocoon Rearer and Silk Reeler.

Division of labour in silk industry.

The silk industry in the State comprises three well marked divisions, *viz.*, cultivation of the mulberry plant to feed the cocoons, the rearing of the cocoons and the reeling of the silk from those cocoons.

A reeler's production and income.

On an average, a reeler is able to produce 2 seers of silk (24 tolas per seer) per day and requires 14 times that weight of cocoons, *i.e.*, 28 seers, to produce that quantity of silk. The price of the silk reeled is about Rs. 10, and, to get this he has to buy cocoons, besides pay coolies and buy fuel. He earns annas 8 per day and, by working for 200 days in the year of 5 cycles of 40 days each, he realises about Rs. 100 in all. This is a fair income for a person engaged in a rural occupation, especially if this be only a subsidiary one.

Ten families of cocoon rearers are required to keep one reeler engaged, *i.e.*, the production of cocoons from one family of cocoon rearer working for 40 days will suffice for 4 days' work for the reeler.

Those of cocoon rearers.

The value of the cocoons required by a reeler for 40 days' work will be Rs. 340 and the share of one family of cocoon rearers is Rs. 34. But this rearer has to pay for mulberry leaf at Rs. 10 for a cycle of 40 days and Rs. 2 more for seed cocoons and has left for himself Rs. 22 for his work for 40 days and for five cycles in the year realises Rs. 110.

Income of mulberry grower.

The mulberry cultivator gets Rs. 50 per acre for the five cycles.

Thus the mulberry cultivator gets the least and the cocoon rearer the most in the industry.

Resulting value of silk.

The value of the raw silk reeled off will have to be equal to the sum of these three figures at the least, before it reaches the merchant and manufacturer and a sum of Rs. 260 will be the lowest value of the silk produced by utilising the leaves of mulberry grown over one acre.

N.B.—Elsewhere will be found the value of the silk production corresponding to one acre of mulberry to be Rs. 265. This was obtained from data given in the Administration Report for 1880-81.

Pattwegars.

One hundred and fifty-four families of Musalman, *Pattwegars* of Sindghatta (four miles east of Krishnarajpet, Mysore district) as well as those of Channarayapatna, Hole-Narsipur and other places have lost their occupation of preparing and supplying twisted and dyed silk-thread to the weavers of *pancheys* of Melkote, Hosaholalu, Kikkeri, etc., owing to the introduction of Japanese silk for those purposes. Their daily income varied from Re. 1 to Rs. 2 per family and now they are not able to earn much more than annas 2 to 4. They are at present chiefly engaged in preparing silk threads for wear round the waist, waist bands, etc., and their condition is one deserving of detailed study and betterment.

Weavers in Wool.

Wool weavers in Sira borrow money without interest but have to sell to the money-lender all the *kumblies* woven by them at one anna per *kumbli* less than the market rate and the money to be returned in 9 months. Fifteen such are woven per month and the loss is annas 15 per month on this account. The value of the 15 woollen blankets does not much exceed Rs. 11-4-0 at an average of annas 12 each. **Sira.**

The weaver of this place depends upon the sowcar for supply of wool and for the sale of the *kumblis*. The sowcars buy 28 lbs. for Rs. 5-12-0 and sell 25 lbs. for Rs. 6-8-0 and, for the two maunds required per month, gain Rs. 2-12-0 on Rs. 10-4-0 spent. Again wet wool is bought at Re. 1-8-0 at Ambur and it costs Rs. 2 at Chiknayakanhalli, where it is sold at Rs. 3 per maund or the sowcar gains Rs. 2 on every maund on this account or a total of Rs. 4-12-0 on the four maunds of wool supplied to each loom. **Chiknaya-kanhalli.**

The weaver loses Rs. 3 more every month by having to sell to the sowcar the product of his monthly work, *viz.*, 12 *kumblis* at annas 4 less each than the market rate.

The total loss thus incurred is Rs. 7-12-0 per month per weaver and this on a total of Rs. 25-8-0 being the market value of 12 *kumblis*, at Rs. 2-2-0 each. Most of the weavers here have to be satisfied with their lot as they are indebted to the sowcar and cannot get out of his clutches.

Collectors of Hides and Skins.

This work is done almost exclusively by a part of the 8,000 *lubbeys* or Tamil speaking *Mussalmans* from Vaniambady, Ambur and other places, although there are 3·14 lakhs of *Mussalmans* in the State, besides 6·14 lakhs of *holeyars* and 3·08 lakhs of *madigars*. **The lubbey.**

The *lubbey* works as a wholesale merchant and also as a retail buyer and seller of hides and skins. The cooly *lubbey* collecting hides and skins for others is paid Rs. 5 or Rs. 6 per month with food and clothing found for him.

The local *kuluwadis*, *thotis* and *thalayaris* or *begars* and *thalwars* are the real suppliers and they borrow up to Rs. 15 from these *lubbeys*, agreeing to repay the amount in the form of hides and skins. They often supply at fixed prices per hide or skin irrespective of weight and the weight whenever demanded is shown on a spring balance, which is not understood by the *kuluwadi*, etc. **Village transaction in hides, etc.**

At Hunsur, cattle hides are sold at Rs. 3 each and buffaloe hides at Rs. 3-4-0, though if sold by weight, they would fetch much more. At Saklespur, the price varies from Re. 1-8-0 to Rs. 2-8-0 per hide and at Arkalgud from Rs. 2-8-0 to Rs. 3, while at Koppa it ranges from Re. 1-4-0 to Rs. 4. **Prices of hides and skins in some places.**

The average mofussil rate of sale is 8 lbs. per rupee or Rs. 3 per hide of 24 lbs. It changes hands twice. The mandy merchant buys the hide at 5 to 6 lbs. per rupee from the itinerant cooly *lubbey* and thus pays nearly Re. 1-8-0 for the 8 lbs. which was bought for one rupee by the other or Rs. 4-8-0 per hide of Rs. 3 in value. **Profits.**

If this work be done by the local *kuluwadi*, etc., he would earn this amount and if he collects 15 hides per month, he would be assured of an income of Rs. 7-8-0 per month. **How local men let slip chances of income.**

The mandy merchant buys at about 5½ lbs. per rupee and realises Re. 1-6-0 by the sale at Bangalore, after allowing 12½ per cent for drying, *i.e.*, he gains annas 6 on every rupee spent in buying hides in the mofussil and for the Rs. 4-8-0 spent **Gains of the mandy lubbeys.**

by him, he earns not less than Re. 1-8-0 making the sale value about Rs. 6. The price of a hide is thus doubled by the time it reaches Bangalore.

An estimate of production of hides and possible gains to local people now lost.

Considering that there are about 4·8 millions of horned heads of cattle and assuming that 23 per cent die or are slaughtered every year, the number of hides available would be at least 11 lakhs and this would find sufficient and very lucrative employment to a good number of the local *Mussalmans*, *madigas*, *holeyars* and others as the profits earned would be at least 5½ lakhs of rupees, at annas 8 per hide in mere collecting. Then there is the trade which would find more lucrative employment to several others and then again the tanning and the manufacture of the leather into articles.

Profit in skin trade.

In the case of skins, the mofussil price varies from annas 10 to Re. 1 each, while its sale value at Madras is about annas 7 per lb. If 4 lbs. be taken to be the average weight of a skin and allowing a reduction by 12½ per cent in weight for drying, the 3½ lbs. would fetch Re. 1-8-6 at Madras and deducting 1½ annas for expenses, the net profit would be annas 7 per skin.

An estimate of production of skins and profits of trade therein.

The 37 lakhs of sheep and goats would, at 40 per cent mortality, yield a little over one million skins with an aggregate profit of nearly 4½ lakhs of rupees and this amount is large enough for a number of the local people engaging themselves in it.

Workers in Brass and Copper.

Income of workers at Magadi.

The economic condition of the workers in brass at Magadi is anything but satisfactory. The demand for his wares is not great and the value of the annual outturn for the 7 families engaged in the work is only about Rs. 4,700.

Each worker spends about Rs. 50 per month and earns Rs. 56 and if the two coolies he employs belong to his household, then the three people are only wage earners as they get about Rs. 16 between them. But they have agriculture as a subsidiary occupation and are, besides, in their own native places.

At Nagamangala.

Every one of the 16 families of workers in brass and copper at Nagamangala spends Rs. 8 for the 1⅛th maunds of metal including 12½ per cent for wastage and Rs. 2-8-0 on wax, besides annas 15 on cooly and fuel in the form of wood, charcoal, and cowdung cakes. The manufactured articles weigh one maund net and are usually sold at annas 10 per seer and thus the worker realises Rs. 25 per month. This is his gross income and if the Rs. 11-7-0 be deducted, his net income works to Rs. 13-9-0 per month. He earns more in the case of idols, etc., for which, however, the demand is smaller.

In any case, the Nagamangala worker is better off than his compeer at Magadi.

The total metal consumed annually at Nagamangala is only 192 local maunds, though the value of the articles produced amounts to about Rs. 4,800.

At Sravanabelagola.

The metal workers at Sravanabelagola number about 500, besides 25 workers on copper sheet from Goa. It is reported that in this and surrounding villages, more than 20,000 local maunds of brass are converted into vessels, besides about 1,000 maunds of copper and some bell metal.

There are two methods of work in vogue at Sravanabelagola and surroundings—*rasi bitti* and *sala bitti*. According to the former, the worker receives 15 local maunds of brass sheets and he has to return an equal weight of vessels, all expenses being met by the employer.

In return for all this work and expense, he receives Rs. 4-4-0 per maund or Rs. 63-12-0. The worker gets from 4 to 8 annas per maund according to the time taken.

According to *sala bitti*, the worker is indebted to the sowcar to an extent of Rs. 100 or more and his earnings are less.

Coppersmiths from Goa are paid Rs. 1-12-0 per maund of *rasi bitti* and they include in the weight of the vessel, the weight of the iron used in the lip of the vessel.

The cooly maistries who bring these Goa people for about four months annually earn substantial profits.

Bangle Glass Maker.

Absence of a local industry to manufacture glass for bangles has necessitated the local makers of bangles to be satisfied with the small supply they could get at a very heavy cost from Ambala, Ferozepore, etc.

The 2,000 Bengal maunds of coloured lumps of glass imported from those places annually cost Rs. 10,000 for material and Rs. 6,000 more for railway freight to Harihar. This is an additional expense that could be avoided if the glass could be manufactured locally.

The Malnad Ryot.

The cost of cultivation of arecanut and of paddy has risen in the *malnad* owing to depopulation and to the consequent necessity to import South Canara labour. This labour is getting more and more difficult to procure in sufficient number and at the former wages, as higher wages are earned elsewhere. Moreover, money advances are now demanded and unless they are paid, the below ghat cooly does not come to work.

Borrows and spends more.

The ryot has thus to borrow money for such payments. This is the first disadvantage. He has also to spend more than before on cultivation as he pays higher wages. This is a second disadvantage. It is no doubt true he could repay his debts, if he were economical with his returns from the fields but his vanity induces him to spend on marriages, etc., and, though there is a general rise in the price of food stuffs, he could not benefit thereby, since the creditors make it a point to advance money on crops and buy the produce at as low a valuation as possible.

Cannot repay.

Some remedy.

One of the remedies to this state of affairs is to convince the ryot of his real economic condition by personal and frequent discourse and this should precede the imparting of literary education to his children.

Co-operative grain and other stores.

The next desirable step would be to organise co-operative stores in almost every hobli, whereby the cultivator could send his surplus produce for being transported and sold. He could thus get the maximum benefit accruing from the increase in the prices of grains. These co-operative stores should also supply the co-operators with provisions and other wants such as clothes, etc., at rates much more favourable than at present.

Provision for the rainy season another special cause of indebtedness.

The necessity of the *malnad* ryot to buy his stock of provisions for the rainy season is one of the causes which places him under the control of the merchants or money lenders. The organization of such co-operative stores would obviate this necessity of their purchasing whole-sale supplies for 6 months and of being themselves under the clutches of the retail merchants or sowcars, both of which functions are usually combined in one in the *malnad*.

Transport facilities necessary for such stores.

In order that this co-operative store should work continuously, throughout the year, there should be facilities for transport between these interior tracts and centres of trade and railway stations. It appears to me that an introduction of

motor-trucks will facilitate traffic, especially to co-operative stores in the various centres of the *malnad*.

Opposition likely and actual.

Such a proposal would no doubt meet with severe opposition from the local merchants or sowcars, as they would be greatly affected thereby. As a matter of fact the local sowcars of Thirthahalli offered a considerable amount of opposition to establishing a *sante* or a fair, in spite of the efforts of the local officers of Government, and it appears that the attempts were frustrated by the merchants under-selling their wares during *santes* and thus making the organization a thorough failure. But if they are convinced of the determined attitude of the local authorities and of Government on the point, they would certainly yield. Government might lose some amount in this case, so as to make up the loss to the sellers at the *santes* and if this is continued for 3 or 4 *santes*, then the local merchants would back out.

What might be done.

Government might encourage the starting of one such Store at first in order to demonstrate to the people its profitableness.

Reduction in the cost of living and increase in income to the ryot would be the first results of such a venture.

Other advantages from the proposed motor service.

The proposed introduction of trucks and traction-engines would also help the *malnad* ryot to move out of his complete isolation during the 6 months of the year and may perhaps help to improve his health by facilitating his frequent travels to places outside.

It will, besides, facilitate the provision of medical help to the ryots at their distant village homes during the rains, as well as at other seasons. The fourth and most important result of such an introduction would be to encourage the settlement of people in the *malnad* parts, from other areas of the State or from outside.

Such a colonization of outsiders would enable the ryot to get greater yield from his lands and to introduce more valuable crops, such as sugar cane and the value of land would consequently rise.

Another very important effect of the introduction of the traction-engine would be to enhance the value of the forest products which are now rotting in the jungle and to increase the revenue to Government from forests.

Mr. Chakravarthi's proposal.

A suggestion to introduce motor service was made by Mr. J. S. Chakravarthi, Comptroller, in a note styled "Opening up of Mysore" which was circulated to the members of the Conference in October 1911. Mr. Chakravarthi's proposal was general for the whole Province, but here I confine it to the *malnad* only and that for 2 specific objects, *viz.*, (1) distribution of provisions and goods and (2) medical help.

Mr. Chakravarthi estimates that a concern like this would pay only 3 per cent. He wanted 240 cars at an initial cost of Rs. 30 lakhs, with an annual recurring expenditure of 6 lakhs of rupees.

The motor service now suggested not to be a purely business concern.

The suggestion now made is not to be considered from a purely business point of view, as it is intended to help suffering humanity and to enable them to live better and to resist the attacks from disease. Increase of population incidental to such an opening up of the country will help to develop its resources. These are the points of view that stimulated this suggestion.

As an experiment, 4 cars might be run between Shimoga and Agumbe, and if successful the scheme might be extended to other important *malnad* parts.

Difficulty anticipated.

As observed already, the chief difficulty in the way of giving effect to the scheme would be to overcome the demands of the money lenders for the repayment

of the loans advanced by them to the ryots, who under this scheme of co-operative grain and other stores, will no longer supply the produce to them.

Suggestion.—A committee should go into great detail into these questions, both by personal enquiries in the villages and by a study of the records in the Registration and Revenue Departments. **A committee to be appointed.**

It should consist of one very experienced Revenue Officer of standing, one Deputy Commissioner, one Forest Officer and a retired Judicial Officer, one of them acting as Secretary.

The Areca Growers of the Malnad.

From enquiries made at Koppa and other places I learn that the areca growers are subjected to several sources of loss which are avoidable.

The *lubbe* of the Kadur district and the *mopla* of Thirthahalli are the people very much benefited by this industry. They travel on horse back to the remotest corners and villages of the areca growers and volunteer to supply the ryots, at credit rates, piece goods, provisions and other articles most needed by them. **The lubbe and the mopla exploit the areca region.**

They then get a writing that all the areca produced should be sold to them at 4 annas less than the current market rate.

While collecting areca, the *lubbe* or the *mopla* will have so managed the weighing of the nut, etc., in several ways that, nearly 25 per cent will be added to the declared weight. First and foremost, there is what is called *bidukattu* or reduction in price by at least 4 annas per maund; secondly, on every 100 maunds bought, about 5 maunds are given away free as *mamool*. He has to pay also what is termed *labhasare*, which works to about half a seer on every maund. Then there is what is called *mungole*, that is, an extra piece of iron added to the weight of the scale pans. There are several other practices, the total effect of which is to make the *lubbe* get much more than what the ryot is paid for. This works to about Rs. 2 at least on every maund. **How the areca grower loses.**

The total loss thus sustained by the ryots in several parts of the Thirthahalli area is estimated at about Rs. 75,000 every year which can be saved if about 7½ lakhs of rupees were avilable as capital.

The sowcars of Thirthahalli assembled at a meeting made me understand that such was possible.

It appears also that the ignorant people of the villages sell areca, weight for weight for fish, which is valued at Rs. 2½ to 3½ per maund of 24 lbs.

CHAPTER VII

SUGGESTIONS, INCLUDING A FUTURE PROGRAMME.

SUGGESTIONS.

In this chapter it is proposed to recapitulate the suggestions contained in Part I and the more important ones in Parts II and III. They are arranged here in practically the same order in which they occur in the body of the Report and under the same heads.

Depopulation of the Malnad.

Improvement in the sanitary condition and surroundings of the village sites in the *malnad* tracts, by removing them to healtheir quarters; by locating the wells for drinking water at higher levels, so as not to catch the drainage or soakage from cattle sheds and manure pits; by securing better ventilation to the houses; by planting the *bevu*, the *thulsi* and the Eucalyptus around, the two latter of which have the additional advantage of serving as industrial plants.

Abolition of the *thera* system, likely to increase married female population;

Educating the people to the value of taking European medicines;

Establishment of more hospitals and the appointment of a number of Lady Apothecaries;

Destruction of *lantana*;

Replacing the cotton *duppattis* by the old *kumblis*; and

Organisation of motor service pending the construction of railways and forest tramways are some of the steps that appear necessary to check the depopulation of the *malnad*.

Starting of a number of industries utilising the resources in forest materials, in cheap fuel or water power will materially help to check depopulation.

Colonisation of capitalists willing to apply money and machinery to agriculture will also tend to produce the same effect.

Possible Agricultural Developments.

The preliminary enquiry started regarding the production and consumption of articles of food and clothing should be revised and developed, besides being continued to other articles.

The possibilities of increasing the average income of the ryot population should be studied exhaustively and practical steps taken.

The practicability or otherwise of introducing systematic and general farming into the rural parts, for flowers, fruits and vegetables, as a few of the possible ways of increasing the income of the ryot might receive special attention; also dairy farming, ostrich farming, cattle and sheep breeding and growing of fodder and manurial plants.

The special conditions of the *malnad* as favouring the establishment of modern agricultural methods and some special industries also deserve consideration.

Extraction of essential oils from grasses like the lemon grass; from leaves like the dalchini—cinnamon, or orange and lemon; from flowers like the rose and Jasmine and from fruits like the orange, is an ideal rural industry for Mysore; and this, with the necessary cultivation of flowers and other raw materials, would considerably enhance the material prosperity of the Mysore ryot.

Industries in preserved fruits and desiccated vegetables is another field, likely to benefit the ryot and the capitalist alike.

Possible Forest Industries.

Some new industries that might be started utilising the forest products are :—

Destructive distillation of wood.

Establishment of saw mills in the *malnad*, say Shimoga, using suction gas plant fed by wood fuel or even wood refuse or by the charcoal from destructive distillation of wood.

Encouraging the start of a Sandalwood Oil Factory ; or Government starting a large still to prepare sandal oil, as in the case of the Government Distillery.

(*N.B.*—This work should be undertaken only after a thorough enquiry in India and Europe, to be assured of an enhanced prospective income and of its permanency.)

Manufacture of tannin extracts from *Thangadi* bark ;

Of ordinary ink by using the myrobolams available locally ;

Of printers' ink by utilising the cocoanut shell charcoal of a probable estimated annual supply of about 700 tons and the local supply of lac ;

Establishing a Match Factory at Shimoga or other places ;

Furniture Factories at Tarikere or Shimoga by the use of suction gas plants ;

Manufacture of bobbins for supplying the cotton mills in Bombay and other places by utilising the soft wood available round about Chennapatna and in the forests and the manufacture of walking sticks, of casks from split wood ;

All deserve enquiry.

There is a very large scope for investigation and practical work in the field of fibres, forest or agricultural.

Mr. Cameron's suggestion for a nursery for fibre plants is a point for consideration by the Forest Department.

Cocoanut Coir

Manufacture of cordage and coir rope from cocoanut coir is a subject awaiting detailed investigation and solution, especially as the quantity of it wasted as fuel is not less than 2,700 tons from cocoanut gardens alone and about 1,300 more from gardens in which areca is also grown ; or a total of about 4,000 tons of a potential value of about 6 lakhs of rupees. There is still the quantity available from the nut dried on the palm for copra and this quantity would be another 4,000 tons, of an additional value of about 6 lakhs of rupees, making up a grand total of 8,000 tons, worth about 12 lakhs of rupees.

Preparation of coir matting now being done crudely by a few local people and on a small scale for local consumption might be improved and the industry organised for export purposes, after the local varieties of the palm are ascertained and compared with those in Malabar and the industry is fully studied, at it is practised on the West Coast.

Areca Fibre.

The 27,000 acres under areca together with the 54,000 in which both areca and cocoanut are grown would yield about 16 lakhs of local maunds or 16,000 tons of areca fibre and this is all going to waste now and is a nuisance to the people of the areca villages. Some use should be certainly found for this.

A ton or two might be sent to the Indian Imperial Institute in London and its commercial use and value, if any, might be ascertained.

Whether this and the cocoanut fibre which is not fitted for cordage or matting could be used to manufacture paper is also a point for investigation by experts.

Mats and Baskets.

One or more good workers in mats from Tanjore, Tinnevelly or Palghat might be induced to settle down at Kadakola for about 6 months and to train a number of the local men in superior kinds of work.

Weaving for mats with ornamental and complicated designs may also be introduced.

Some of the nomadic tribes might be induced to settle down below the Marikanave and the Borankanave reservoirs and taught the industry in an improved form.

The Coffee Planters consume about Rs. 50,000 worth of date mats every year and many of them are prepared to buy mats of better finish, if they could get them.

Chikmagalur and Saklespur will be two convenient places or a place like Cheekanahalli, Belur taluk, where colonies of good workmen might be settled and the supply met. The Coffee Planters are put to considerable inconvenience in getting their required supply and of good quality.

Nearly 5 lakhs of baskets worth about Rs. 38,500 are consumed annually by the Planters and *watte* and *bamboo* out of which they are made are abundant. The supply of baskets might be regulated and the quality improved by organisation and training of the men.

Paper Pulp.

Possible cheapness and abundance of bamboo supply; likely cultivation of *bhabhar* grass in the Tollollu basin, as a raw material for paper; the possibility of getting cheap power from waterfalls or from wood fuel in forest areas, combined with that of electrolytic bleaching of paper pulp, dispensing with the supply of costly chemicals, are all points that encourage a detailed investigation into the whole question of the manufacture of paper pulp.

Vegetable Tallow.

Vegetable butter, now being obtained on a small scale from the seeds of some forest trees is worthy of full investigation, as well as the practicability and economy or otherwise of getting a commercial supply of such solid fatty oils for being used in the preparation of scented pomades.

The practicability or otherwise of using cocoanut shell charcoal for clarifying ordinary fatty oils is another point for study.

Gums and Resins.

Gums and resins like the famous *Kino* of commerce, as well as the numerous medicinal plants and herbs offer a very vast field for much useful work from an industrial point of view.

General.

A Botanical survey of the State might also be undertaken, special attention being devoted to the detailed investigation of the numerous economic possibilities of the forest resources. For this purpose, the services of an eminent Forest Chemist might be secured, for at least two years.

The Central College might be affiliated to the Madras University in Botany and a class opened.

Possible Mineral Industries.

Electric smelting of iron ore in the Bababudan area by developing 5,000 H. P. of electrical energy by the fall of about 700 feet in the Somavahini river and also the manufacture of ferro-manganese and manganese steel are important projects requiring development and materialisation.

Manufacture of potassium permanganate or Condy's fluid, so much required as a disinfectant and of Potassium bichromate used in the arts is suggested by the abundance of the ores of manganese and of chromite.

In both cases, potassium carbonate required will have to be imported and it is a point for consideration whether it will pay to collect lantana ash containing 13·26 per cent of potash to manufacture the above two compounds, as well as potassium ferro-cyanide utilising, for this purpose, the clippings of hides and skins from tanneries and also the hoofs and horns of cattle, sheep and goats and lastly, the local iron ores.

Even the saw dust from saw mills might be used in place of clippings of hides and the cost of manufacture lessened by locating a future factory in forest areas, where wood fuel is abundant and also lantana.

Prospecting for iron pyrites might be organised with a view to utilise it to prepare sulphuric acid, the starting point of all chemical industries.

Preparation of Glass.

The hill masses of the crushed gold quartz of the Kolar Gold Fields and the decent annual supplies of earth soda from near Mandya to the extent of about 100 tons suggest an experimental enquiry, if some impure form of glass like medicine bottles, beer bottles, etc. may be manufactured and a factory located at or near Shimoga, where wood fuel is abundant.

About 6 Bengal maunds of these materials might be sent to the Talegaon glass factory near Poona for experimental purposes and soda bottles, medicine bottles or beer bottles prepared and also lumps of glass, coloured blue and green for use by the local bangle makers and save them Rs. 6,000 and more every year on railway freight from Ambala, etc.

China Clay.

The occurrence of China clay in several parts of the State and the possible cheap and abundant supply of wood fuel near Shimoga also favour an enquiry into the economics of a possible venture to manufacture China wares or porcelain near Shimoga.

The possibility of supplying the Indian Cotton and Paper Mills with China clay, as a filler, deserves detailed enquiry, as well as the manufacture of paints, ordinary and fireproof, since Ochers and Ochery earths occur in decent quantities in many parts of the State and the demand for paints is fairly large.

The lime required by the Coffee Planters for manuring the gardens might be supplied from Balemuri near Honnali and the import from below ghats stopped.

Preparation of Epsom Salts and of Magnesia Cement.

From the fairly large quantities of magnesite available near Kadakola, etc., might also form the subject of an enquiry.

Corundum.

Occurring in several parts of Mysore might be ground down and emery wheels prepared and also garnets powdered and used for preparing sand paper.

The various ornamental building stones of Mysore deserve to be pushed into the European and American markets and if decent demand could be created, the stone sawing and polishing plant bought for the Palace works might be utilised.

Work in Metals.

The old stereotyped and wasteful methods of working in metals, as practised at Magadi, Nagamangala, Sravanabelagola and Seethakal might be improved and developed by introducing box moulding and pressed and turned metal work.

An officer of Government with about half a dozen of the more well-to-do enterprising and energetic metal workers from these places might inspect the several metal factories at Poona, Sholapur, Alighar, Nagapatam and Madras and introduce the manufacture of travelling trunks, tumblers and other turned articles and also locks.

Some of the local workers in metals might be taught the method of preparing large copper vessels, now done exclusively by the Goa people working at Sravanabelagola, Bangalore and Mysore.

Electroplating on a large scale is another field for investigation.

Introduction of a course in improved smithy and forge work in the existing industrial schools along with carpentry, using power lathes, would materially improve the efficiency of the local blacksmiths and carpenters.

Tiles.

Manufacture of roofing tiles of the Mangalore pattern, as at Saklespur and Hirehalli in the Manjarabad taluk is not carried on as efficiently as might be.

A Tile Expert might be deputed to help the owners of these two factories in improving the type of the furnace, introducing a pug mill worked by bullock power and arranging for the training of the local men, so as to be free from the difficulties of procuring the skilled labour required from Mangalore and other places on the West Coast.

A loan might be granted to the owner of the Sringeri Tile Factory, as he has already shown earnestness of purpose by starting the industry and working it. The loan would very much develop the industry.

The Varada Tile Works at Yelagalale near Sagar have also shown self help and the small encouragement they require might be given, *viz.*, fuel free of cost and help of the services of a Tile Expert.

The tile industry as practised on a small scale on the West Coast might be studied by an officer and, if necessary, some men brought from there to help and develop the existing concerns and also to start new ones in new areas in the State.

Some of the more enterprising and well-to-do local potters might be taken by the officer to the small Tile Factories on the West Coast, so that they could easily start on a similar scale in their own places.

General.

Special courses of lectures might be organised on minerals of commercial value and on prospecting for minerals for the benefit of the students of Geology and of the general public.

An Elementary Mining School might also be organised to teach the mining of metalliferous minerals and some of the deserted gold mines, like those of Ajjampur, might be used as places for demonstration of the methods of mining underground.

Many minerals which were museum curiosities some years back are now found to be of great commercial value and prospecting for these minerals would be an occupation attended with large returns in case of success, with its necessary concomitant, *viz.*, loss in case of failure.

Facilities might be provided and encouragement given to likely mineral collectors and sellers.

A detailed Mineral Survey of the State, especially if rendered into easy Kannada, would help to stimulate some of the local people to enter into the field of minor mineral industries which can be worked with a comparatively small capital.

Power Resources.

A detailed enquiry should be undertaken to ascertain exactly the maximum and minimum quantities of power from the water falls as distributed over different parts of the year and for the last 20 years, together with the nature of the various resources, agricultural, forest, mineral or animal, available within a radius of about 20 miles from those sources of power.

The possibility of working rice mills, etc., by the fall of water might also be considered.

The practicability or otherwise of introducing suction gas plants by the use of wood fuel is another point for full investigation.

Destructive distillation of wood might be considered either under forest resources or under power. Anywhere the subject is a very important one and deserves immediate investigation and solution.

There is a very large demand for charcoal in Bangalore and surroundings, from the goldsmiths, washermen, sweetmeat preparers, iron, copper and silver smiths and from users of suction gas plants.

It is a point for detailed investigation if it would pay to replace the present wasteful methods of charcoal preparation in the Bangalore district by a wood distillation plant, the wood—casuarina in this case—being supplied by the charcoal preparers themselves.

Considerable amount of electric power can be developed in the interior of forests by using the wood now rotting, or the charcoal prepared therefrom.

It is a point for future enquiry if it would pay to utilise this power for industries in convenient places or to run tram lines in the forest areas.

Sericulture.

Government should take the initiative in two directions, Educational and Industrial. According to General Booth Tucker's Report published in 1910-11, the Bengal Government contribute Rs. 40,000 to expand mulberry cultivation and to rear healthy worms. The Kashmere Government spend annually from Rs. 75,000 to Rs. 90,000 in the purchase of healthy seed alone. The Madras Government spent nearly four lakhs of rupees for erecting filatures at Vellavadu, though the expenditure did not produce the desired results.

Educational.

The educational work should consist mainly in training young men and women to select healthy seeds by the use of an ordinary microscope, as is done in the

Department of Midi in France, where there are 40 Normal Schools doing this training work.

The men trained to select healthy seeds should be attached to village schools, thus bringing the knowledge home to the villagers.

Industrial.

Grainages or seed rearing establishments should be started at such important silk centres as Chennapatna, Bangalore, Kunigal and Vadigenhalli. This is a *very urgent* work, as prevalence of disease among worms has discouraged many rearers of cocoons.

The initial cost of establishing such *grainages* capable of supplying over 1,000 Bengal maunds or 80,000 lbs of seed per year would, according to Mukerji, be only Rs. 2,400, while the working expenses would amount to Rs. 1,500 per year with an annual outturn of Rs. 4,000, and a maximum of Rs. 8,800. It apppears that several owners of such establishments have grown enormously rich in France, Italy, etc., and that the *grainages* completely revived the silk industry in Europe.

A silk expert should be engaged, the work organised and continued for at least five years.

If the *grainages* succeed, as they are likely to do, the silk industry will expand and fresh fields of employment will also be open to small capitalists, besides a large field for agriculturists.

This will serve as a very important starting point for the development of rural and cottage industries in general, to the increased benefit of the general population of the State.

Providing irrigation facilities to cultivate mulberry is another direction along which Government might move, since the number of crops of leaves and of cocoons is likely to be increased by 40 per cent over the present general average of 5 crops. Introduction of an improved method of re-reeling of the *Kora* silk is another direction for improvement.

Rearing of Eri silkworm is likely to increase the average income of the general population and it has certain special points in its favour, *viz.*, it is easier to rear, cocoons are ready in a fortnight while 40 days are required for mulberry cocoons; the feed of the Eri silkworm is castor leaf, not relished by the cattle; it is adapted to beginners in sericulture, as the worms are larger and easier to handle; and finally, the cocoons are not steamed and the chrysalis not killed, as in the case of the mulberry cocoons.

An export trade might be set up and developed in Eri cocoons, even if facilities be not forthcoming to card, comb and spin them locally, since they can be pressed, baled and transported.

The yield from an acre of castor is said to be Rs. 60 and women in Bengal are reported to earn very easily from Rs. 10 to Rs. 12 per year from this source.

Weavers in Cotton.

The first step towards improving the condition of the hand loom weaver in cotton is to organise Weavers' Co-operative Stores, to be worked under the close supervision of local Government officers for some time and utilising the business habits, influence and experience of the local sowcars.

The sowcars should be held responsible for the money or stores supplied and, in return for their services, they should be advanced the money or yarn and stores at 6 per cent interest while they should get 12 per cent from the weavers for advances in cash, yarn, dye stuffs, etc.,

If possible, a part, at any rate, of the supply of stores of yarn might be obtained from the Maharaja's Spinning and Weaving Mills, in exchange for part payment of the dues from them to Government. This is a point to be settled in consultation with them.

As yarn is the most costly item of recurring expenditure for a handloom weaver, the suggested supply of yarn from the Maharaja's Mills, if feasible and practicable, would obviate the necessity for any large advances of money on the part of Government.

The sowcar is to sell the articles produced at rates to be approved by a local *panchayat* of weavers and other leading men, one of whom should be an officer of Government. The sowcar should be allowed 4 per cent commission for this work.

The co-operators should bind themselves to deposit in a Government Savings Bank at least 50 per cent of the *increase* in their earnings due to these and to the adoption of improved appliances.

This saving should be utilised to discharge their debts completely and to lay by enough for two months' purchase of yarn and for introducing improved appliances.

The special feature of this proposal is that it aims at removing his indebtedness permanently and at his working on his own small capital afterwards.

His general intemperate habits should also be minimised by creating a local public opinion denouncing such habits and by social ostracisms, as otherwise, all these attempts at improving his condition will be of no avail.

In addition to what is being done at present, peripatetic demonstration parties should be organised, as in Madras, to convince the weaver of the superior advantages of improved appliances in weaving, sizing and warping.

Working of improved patterns of looms by power is awaiting to be experimented upon.

Wool.

The main lines of improvement to better the condition of the worker in wool would be:—

Improvement of the breed of sheep.

Introduction of a method of clipping wool entire.

Providing cheap accommodation of capital to buy wool at the most favourable seasons on co-operative principle.

Introduction of a simple and cheap device like the Scotch spinning wheel to facilitate the spinning of wool.

Familiarising the use of the fly shuttle in weaving in wool.

Introducing twill weaving to produce cheap blankets and rugs.

Encouraging the dyeing of wool, as coloured woollen yarn is sold wholesale and at such rates that leave little or no margin of profit for the weaver of woollen fabrics.

Preparation of simple felted articles by effecting improvements in the method of preparing *Ujjukumblis*.

And utilising the refuse of wool for local manurial purposes.

Dyeing.

Electrolytic bleaching is a new industry that might be investigated. It requires salt water and electric power. Earth-salt available in many parts of the State might be utilised to get salt water if the imported Bombay or Madras salt is found costly.

Electrolytic bleaching is applied to cotton, jute and even embroidery, besides to paper pulp and woollen hosiery.

Easy accommodation of capital to the purchasers of indigo at Dommasandra, Anekal, Kankanhalli and other places would enable them to save Rs. 4,000 every year and more.

Hides and Skins.

The 3·14 lakhs of local *mussalmans*, 3·08 lakhs of *madigars* and 6·13 lakhs of *holeyars* might be educated regarding the remunerative character of the business of collecting hides and skins.

The subject might be introduced into all the Industrial Schools and into the Panchama Schools and the following taught:—

Essential points in the art of preserving skins and hides for transport.

Rural tanning on improved lines to produce leather to be used in the manufacture of articles of local demand.

Manufacture of leather articles by the use of a leather stitching machine, like the Singer Sewing Machine.

Manure for Coffee, etc.

Starting of manure works at a place between Hassan and Chikmagalur, say at Cheekanahalli is a point worth consideration, since most of the 15,000 to 20,000 tons of fertilisers required by the Coffee Planters is all brought by road from Mangalore or from Messrs. Parry & Co., Ranipet, Staines & Co., Coimbatore or Cohen & Co., Hubli, etc.

Technical Training.

Officers or students intending to travel to foreign parts to study any industry or trade should be first made to study local resources, conditions and needs thoroughly before they are sent out and each should, on his return, engage himself in that industry only or else he might be required to refund at least 50 per cent of the money spent on him. The intending industrialist should also satisfy Government previously that he is assured of capital for the industry on his return.

Statistics of Trade and Production.

The appointment of the Director of Statistics should be revived and he should re-organise the system of collecting statistics after a study of the methods adopted by the Commercial Intelligence Department of the Government of India. He should publish annually statements of trade by rail and road, both external and internal, and also of production and consumption and prepare a report thereon. He should periodically issue bulletins on special subjects and conduct a journal, styled "The Mysore Economic Conference Quarterly."

Preparation and publication of a Statistical Atlas of Mysore should be entrusted to him.

This Atlas might be made into a quinquennial publication and should contain graphic representations of all statistics of production, trade and consumption, as well as the statistics of Education, Irrigation and Finance, besides the chief Vital Statistics.

The descriptive matter and Atlas should also be rendered into Kannada, the former given as short sentences and the latter reduced to lantern slides.

FUTURE PROGRAMME.

The final object of a future programme of work as outlined below is to get the most reliable practical industrial schemes for adoption by the people.

The steps suggested are :—

1. Selections from this Preliminary Sketch as well as any proposed lines of further detailed enquiry should be sent to experts for suggestion and advice.

2. A small staff of 4 assistants should be organised for four groups :—

(*a*) Power resources.
(*b*) Forest resources and industries.
(*c*) Mineral resources and industries and working in metals.
(*d*) Agricultural resources and industries including those in animals and detailed enquiries started on the various points suggested in the report and on others suggested by experts.

3. While this information is being collected, one officer of local experience and information in several branches is to be deputed to inspect the more important industrial concerns in India, of immediate or potential value to Mysore.

He might also study the method adopted by the Commercial Intelligence Department of the Government of India in collecting statistical and commercial information and of publishing the same for the benefit of the people, so that an English and Vernacular Journal, the Conference Quarterly, might be started in Mysore to serve as an organ for diffusing any useful information collected and for the discussion of industrial and commercial questions in general.

4. Side by the side with the above, large quantities of specimens proposed to be utilised for industries should be sent to industrial establishments in or outside Mysore, for experiment and opinion. The help of the Research Institute in Bangalore and of the Imperial Technical Institute in England might be specially secured, as well as that from others.

5. Services of experts should be secured temporarily to frame industrial schemes and propositions for immediate adoption.

6. Schemes and propositions thus prepared should be supplied to people who are ready to launch into business. These should be rendered into easy Kannada and in the form of short sentences.

7. The next stage will be to get an expert for every such industry to start the business and to run it till some of the local men are well trained to manage the business for themselves.

In these days of high specialisation, expert help is absolutely necessary in the various initial stages of industrial development and activity and it is best economy to secure the advice and active help of the various specialists in the several fields.

One full year, if not more, will be required before a beginning could be made to place before the Mysore public useful advice regarding the remunerative character or otherwise of some of the numerous industries suggested.

This programme proposed has also the advantage, in its favour, of enabling the State to get the best advice available on each likely industry and in the speediest manner possible.

Educating the People to the Importance of Industrial Activities.

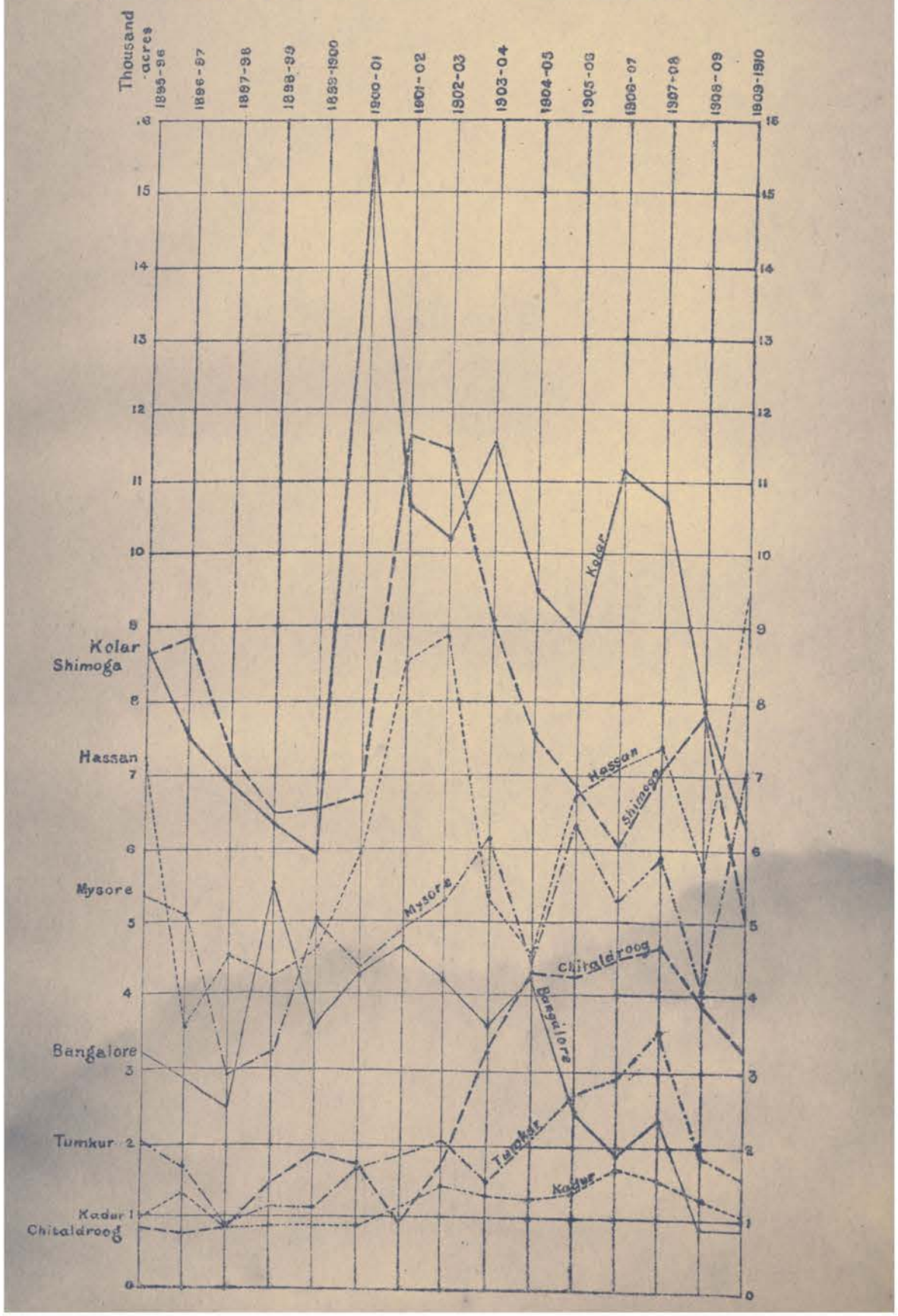
Besides obtaining from experts several industrial propositions for ready adoption, as suggested above, there should be established in each district head-quarter one small museum to exhibit the various raw materials available in the district and to supply information regarding the market value of their manufactured products, together with the extent of demand, local or outside, for such materials or products. The information should be on cards with each specimen and should be given in English and Kannada.

A Library should be added to this in course of time and it should contain all the publications by the Conference and by the Department of Industries besides some standard works.

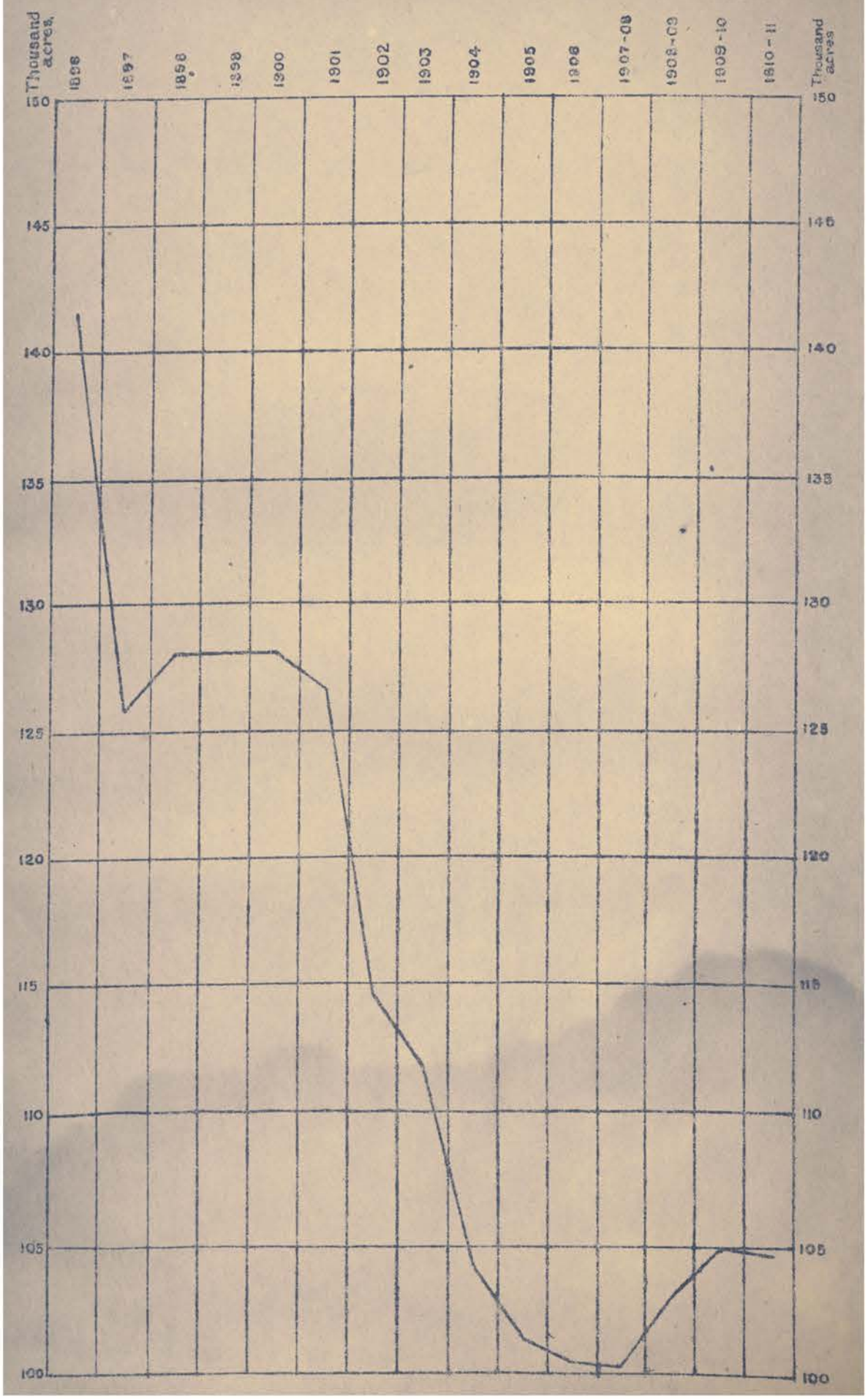
The industrial schemes rendered into easy Kannada as well as the information from the Museum Libraries and others might be diffused by the District Committees of the Conference, with their Associates and by the various touring officers of the State, who, in the discharge of their routine duties, come in contact with the ryot population.

Lantern slides showing the nature and magnitude of important industrial operations of likely use to Mysore and also those of statistics of local production, trade and consumption, etc., should be exhibited to people in important commercial and other centres, giving the whole proceedings a seriousness and gravity, by opening the lantern show with prayers to God and singing the British and Mysore National Anthems.

Graph showing the variations in the areas under Sugarcane in the eight districts of the Mysore State from 1895-6 to 1909-1910.

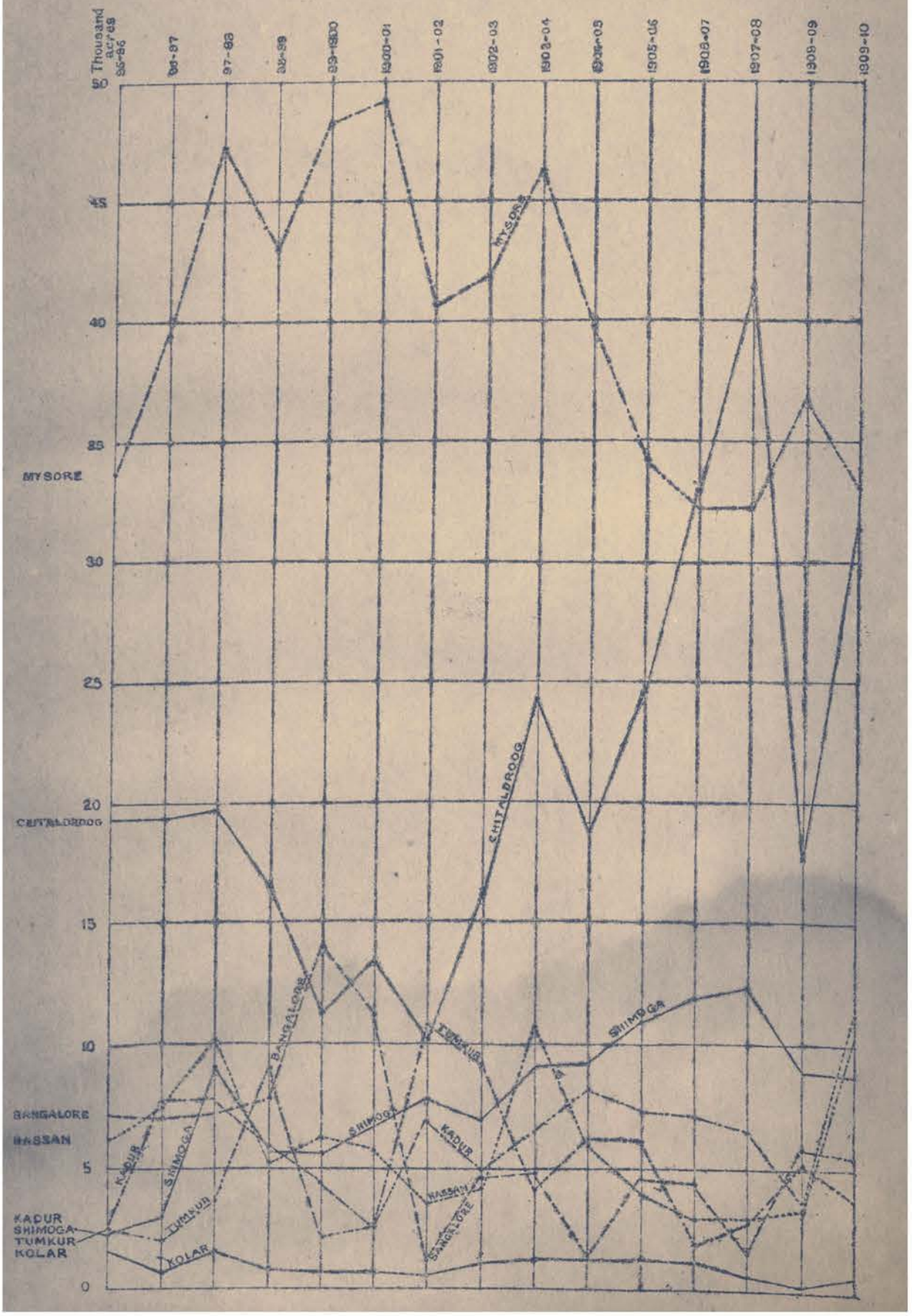


Graph showing the variations in the areas under coffee in the Mysore State from 1896—1910-11.

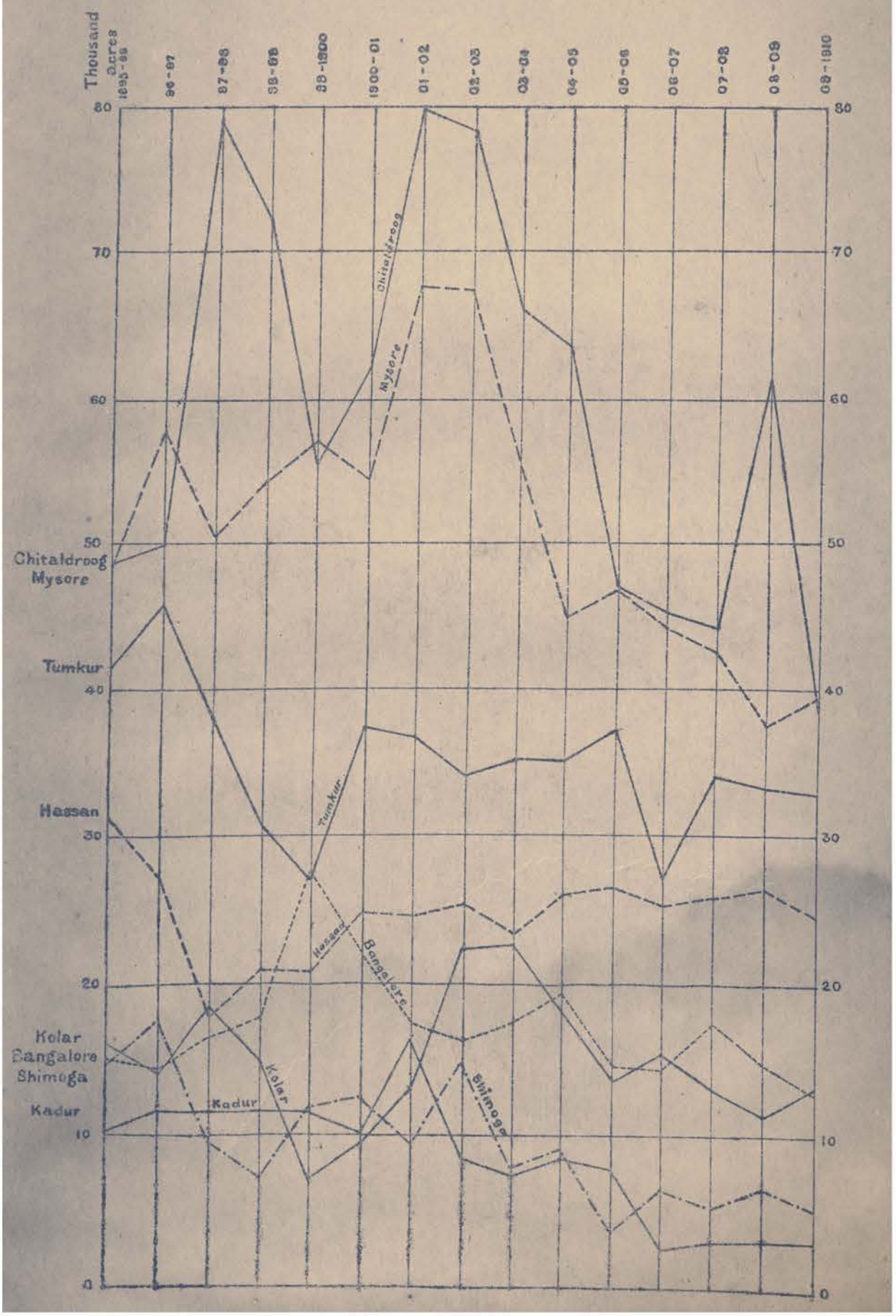


BRANCH OF THE ROYAL ASIATIC SOCIETY

Graph showing the variations in the areas under Til or Jinjilee in the eight districts of the Mysore State from 1895-6 to 1909-1910.



Graph showing the variations in the areas under Oil-seeds other than Til or Jinjilee in the eight districts of the Mysore State from 1895-6 to 1909-1910.



MYSORE, INDUSTRIAL AND COMMERCIAL

PART II.

INDUSTRIES.

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CHAPTER I.

INDUSTRIES—A FEW GENERAL OBSERVATIONS

Some idea of the nature and extent of industrial activities in the State might be gathered from a study of Table XVI, Part I, which gives a preliminary list of power-worked factories in the Province.

The general observations in this Chapter refer to these power-worked industries and also to others worked without such power. A few remarks are also passed in some cases, regarding the extent to which the local people participate in the general industrial activity in the State.

The seventy six establishments using power-steam, electricity, oil or gas and water fall—are observed to fall under five main divisions, *viz.*, (1) Industries of food and drink, (2) of clothing and dress, (3) of building and construction, (4) of mining and (5) miscellaneous.

Out of these, the industries for food and drink number 37 and comprise about 50 per cent of the total and include rice mills, flour mills, sugar mills and jaggery factories, oil mills, coffee works, cigarette factories, distillery and breweries, water supply and irrigation plants.

The second or clothing industries are represented by 14 establishments, made up of cotton ginning, cotton pressing, the cotton and woollen mills and hosiery, a tinsel factory—besides the Mysore Tannery, which, for the sake of convenience, is also included under this head.

Fourteen more fall under the third and are composed of saw mills, toy factory, brick and tile works, mechanical and engineering work shops and industrial schools.

There are nine under miscellaneous, being made up of printing presses, laboratories of educational institutions, manure mills, etc.

The mining industry—the biggest in the State—considered collectively under one head in the table referred to above, consists mainly of gold mining and is carried on by the several mining companies of the Kolar Gold Fields.

The *power-worked industries under food and drink comprise 7 rice mills, 5 in the Mysore district and 2 in the Hassan district in working order, with one more in Tumkur working irregularly. **Rice mills**

Elsewhere† in Part III, the necessity and possibility of future expansion of the rice milling industry in the State have been fully discussed and attention also drawn to the desirability of detailed enquiries being instituted on several points, before recommending the extensive use of rice mills and a reference is therefore invited to those pages.

Rice is also prepared out of paddy by hand labour in the various parts of the State but this part of the industry appears to have suffered contraction, as the number of paddy huskers and rice pounders has fallen by 14·4 per cent from 11,645 in 1901 to 9,972 in 1911.

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* Two of these have recently been started in Mysore.

† Pages 9-11, Chapter II, Part III.

Much of the trade in rice and other grains is carried on by the local merchants, while a decent proportion is taken up by the Tamil speaking Musalmans, who own from a fifth to a fourth of the grain godowns in the new Tharagupet, Bangalore City.

Flour mills. There are five flour mills, 3 in Bangalore, 1 in Kadur and 1 in Davangere. These five mills get much of their supply of wheat from outside and this points to the need there is for Mysore to increase the area under wheat cultivation. The heavy import of wheat flour, of an average of about 84,000 Bengal maunds, valued at about Rs. 4½ lakhs during the decade ended 1910-11, has evidently led to the establishment of two of the flour mills—the Elgin mills in Bangalore and a small one at Davangere ; and, perhaps, there is less need for others being encouraged to be established.

The military and the European population in the State consume a decent proportion of the flour in the form of bread.

Jaggery and sugar. The Palhalli Sugar Factory, now in ruins, owing to the works having been closed down about thirty or forty years ago, worked with a profit at a time when the competition in sugar trade was less keen than now. The disinclination of the ryots to continue to support the factory, together with the fact of the low yield from cane, not much more than about 50 local maunds of jaggery per acre, must have caused the owners to shut down the works, before sustaining losses.

The Goribidnur Sugar Factory has, however, been working on with some fresh energy for the last two or three years and would, perhaps, be able to show better returns, if the molasses find a ready, good and constant market.

Jaggery factories. Three jaggery factories at Urughally, Hudi and Agram have been working for some years, one more was set up a couple of years ago at Kadaba, while three others were installed by Government some months ago, at Haravu, Kunigal and Mavattur, in order to popularise the use of such plants and to show the superior advantages of the power worked factories over the bullock worked iron mills. At the rate at which these last mill the cane, *viz.*, about 6 acres, on an average, in one season of three months in the year, the forty thousand acres under cane in the State would need about 6,600 such iron roller mills, worked by bullocks or buffaloes and the number of mills made by the Chikballapur Factory, nearly 6,000, together with a great number imported, to supplement or replace, support the above estimate.

These 6,600 mills mean about 40,000 persons engaged in this work during the three months of working season every year. All these are local people.

With the popularisation of the power worked plants now on and with the likely increase in the area under Kannambadi and other reservoirs and in other favourable localities, such as parts of the *malnad*, the local production of jaggery is likely to increase and if the yield of sugar content of canes be largely increased, there is some chance of the central system of sugar manufacture, direct from cane, finding favour and taking root in Mysore.

It may be remarked that the production and trade in jaggery is almost entirely in the hands of the local people. It may be also noted that the Mysore State produces much more jaggery and sugar put together than what it needs.

Oil mills. Practically the whole of the average local production of about eleven lakhs of Bengal maunds of oil seeds from an average area of about 2·8 lakhs of acres is utilised for the extraction of oils, either in or outside Mysore, the exports amounting to an average of about 36 per cent of production and imports about 4½ per cent, *i.e.*, a quantity equal to about 68½ per cent of the local production is used up in the State itself.

The work of extracting the oil was being done by 3,572 indigenous oil mills or *ghanas* about 20 years ago, while during the last year, the number fell to 2,796, owing partly to the establishment of four screw presses for castor seeds at Bangalore and Arsikere and of some power worked plants, one in Bangalore and another in Mysore.

Bulk of the export of oil seeds consists of ginjelly and the want of ready market for the cake, as cattle fodder, is one of the main causes operating against the establishment of power worked oil mills in ginjelly seeds and if the local ryots could pay some attention to improving the milk* yielding capacity of their cows and if the difficulties of export of oils in bulk be overcome by tank waggons in trains and bulk storage on board the ship, then much of the ground will have been cleared and large oil mills might be started, after the markets are thoroughly studied. There is still the difficulty of protective foreign tariff on oils to be got over.

Production of oil seeds, extraction of oils and the business of the middle men in the trade of the seeds are all confined to the local people.

Coffee. Nearly two-thirds of the area under coffee and half the production of the berry are in the hands of the Mysore people, although much of the working capital is being financed by outside agencies.

Tobacco. Mysore production of tobacco is inadequate to meet the local demand and large imports are rendered necessary.

There are three cigarette factories in working order and one more in active construction.

Distillery. The only distillery in the Province is owned by Government while the breweries in the Cantonment belong to private agencies, all local.

The increasing production from these has evidently tended to decrease the import.

Cotton. Mysore production of cotton is nearly enough to yield the whole of the cotton cloth consumed by the people of the State but the bulk of the cotton grown is exported, necessitating the import of yarn, of piece goods and others.

The work of production is confined to the local agriculturists, ginning of cotton is almost entirely in the hands of the Davangere merchants and the coolies are mostly local persons. Trade in cotton is carried on almost entirely by the Davangere merchants.

Spinning of cotton into twist and yarn is confined to the two mills in Bangalore. The share holders are mostly from outside the State, as well as the mill labourers.

The local merchants are the middle men in the yarn trade.

Weaving of cloth is carried on by the mills and the handlooms and the local needs of cotton cloth being met equally by the handlooms, the mills in the State and those outside *i.e.*, one-third of the local needs in cotton cloth is met by the local handlooms.

Silk. The whole of the silk industry is almost exclusively confined to the people of the State, in production and in preparation, as well as in manufacture and trade.

There is little or no import of silk and that in silk manufactured is small.

Wool. Excepting the Woollen Mills, the whole of the industry in wool, from production of raw wool to distribution of manufactured articles, is confined to the people of the State. Mysore produces an average of over 30 lakhs of lbs. of raw wool per annum, imports about 4 lakhs of lbs. and exports only occasionally and that in

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* Several ryots sell cattle and leave much of the milk in cows to calves to secure good growth.

small quantities. One fourth of the local consumption of wool is shared by the Woollen Mills and three fourths by the handlooms in wool in the State.

Hides and skins. Production of hides and skins is very important, reaching an average annual value of about 75 lakhs of rupees. The business of collecting and of transporting them is confined exclusively to the *lubbeys* from Vaniambadi and other places in the Vellore district, as well as the industry of preparing them for the market by bark-tanning, while the Mysore people do not fully participate in the chrome-tanning industry.

Most of the skins and much of the tanned hides are exported, owing to want of local demand for the same. If leather manufacturing establishments be started in Mysore, most of this export, especially under the second head might be stopped.

The closely connected industry of collecting tanning barks is also monopolised by the *lubbeys*.

Minerals and metals. Metal industry, from the mining of ores to trade in manufactured articles is out of the hands of the local people.

Very little of the crores of rupees of capital sunk in the Gold Mining industry in the State belongs to Mysore, The Indian labour force is mainly from the bordering British districts and all the gold won is sent out of Mysore. Similar remarks apply with respect to ores of manganese, quarried and exported but to a less extent.

All metals required are imported. Manufacture of brass sheets into vessels is done exclusively by the local men, while that in copper is confined to the few Mangalore and Goa people.

But the local production is largely supplemented by import of vessels, etc., from Hubli, Kumbakonam and Poona.

Trade in brass and copper is almost entirely in the hands of Marwari merchants in Bangalore, while that in iron is carried on by the *lubbeys*.

Wood and bamboo. Tiles. Trade in bamboos and much of that in timber is likewise in their hands.

The industry of preparing Mangalore tiles is shared by the local people and by the Arbuthnot Industrials, Ltd.

The four small factories for Mangalore tiles at Sagar, Sringeri and two in Manjarabad meet a part of the local demaud in the *malnad*, while a part of the production from the Arbuthnot Industrials, together with the import from the West Coast supply the people in the other parts of the State.

Fertilisers The local and heavy requirements in artificial fertilisers for coffee estates are met partly by the two manure mills at Hunsur and partly by the others outside the State.

The needs of the Mysore ryot in this respect are even greater and all important to Mysore, and considering the fact that the local resources in bones are great, several thousands of tons per annum and also in castor cake, and that there are immense possibilities of developing the resources in manure supply, by introducing extensive planting of *honge—pongamia glabra—agese, agati grandiflora*—besides growing sun hemp in fields, every effort should be made to organize rural manure-corporations to make up for the steady and growing impoverishment of the soil.

Trade and finance. It is a well known fact that a very large proportion, if not the whole, of the money-transactions for trade and other purposes in the State is in the hands of the Marwari and Mooltani bankers and the recent establishment of the Mysore Bank, Limited, together with the vigorous measures being taken to increase co-operative banking in the Province might secure to the local people a greater proportion of the profits earned in such money transactions.

CHAPTER II.

COTTON.

General.

The textile raw materials available in the State, *viz.*, cotton, wool, silk and other fibres, are more or less confined to particular areas or tracts, that is, there is a special zone for each, where it is produced or raised more largely than in others.

The cotton tract.

The Chitaldrug district, with the open taluks of Channagiri and Honnali in Shimoga, of Pavagada and Maddagiri in Tumkur and part of Kadur, in the Kadur district, forms a belt of country claiming almost the whole of the cotton produced in the State and may therefore be termed "The Cotton Tract" of the Province.

Out of a total of about 1,01,591 acres under cotton in 1910-11, nearly 84,100 acres are returned by the Chitaldrug district alone, which with about 7,000 acres from the Honnali and Channagiri taluks in Shimoga and about an equal number from Pavagada and Maddagiri in Tumkur, besides about 229 from Kadur, makes up a total of about 98,300 acres in the tract, leaving only about 3,300 in the Mysore district.

A somewhat similar relation in the areas under cotton appears to have prevailed even several years ago, both in the cotton tract and in the other isolated area in the Mysore district. It is seen that out of a total of about 71,600 acres under cotton during 1895-96, nearly 57,000 acres were returned by Chitaldrug alone, with about 10,000 acres from the two taluks of Shimoga and those of Tumkur or a total of about 67,000 acres, that is, over 90 per cent of the provincial area, the Mysore district claiming almost the whole of the remaining balance.

A considerable contraction took place in the area under cotton from the year 1895-96 onwards, and it ranged from 71,600 acres in 1895-96 to about 40,500 in 1899-00.

This depression was soon followed by an expansion in the area under cotton.

N.B.—Two varieties of cotton are grown, *Doddahatti* and *Sannahatti* and hundreds of acres were noticed under Cambodia cotton near Hiriyur.

The Agricultural Department have been distributing seeds of several kinds of cotton at rates varying from Rs. 2-4-0 to 3-6-0 for the quantity required for an acre.

The steady rise in the price of cotton from about Rs. 19 to about Rs. 30 in the course of the decade 1901-02 to 1910-11, had the necessary effect of increasing the area under cotton cultivation from an average of about 60,000 acres in the first quinquennial period of the decade ending with 1910-11, to about 75,000 in the next.

Greater attention to cotton crop stimulated by the possibility of greater return resulted in enhanced production per acre, from an average of about 1·19 Bengal maunds of *lint* in the first half of the decade ending with 1910-11 to 1·54 Bengal maunds in the second.

Yield and value.

From personal enquiries at Davangere, it was ascertained that the yield of cotton was 25 local maunds (24 lbs.) per acre *of Doddahatti* and 20 *for Sannahatti*. Taking the average at 22½ ordinary maunds per acre, the total yield for the whole State for 1910-11 works out to about 22,86,000 local maunds of *Kapas* or seed cotton. Taking the yield of lint at ¼ (one-fourth) of the *Kapas*, a quantity of

5,71,500 maunds represents cotton ginned or lint, and this, at Rs. 10 per local maund, would make the money value of the cotton produced in the State at about Rs. 57,15,000 or about Rs. 56 per acre.

This value does not appear to be high, especially for an occasional good year. A record value of about Rs. 65 was reached in the year* 1907-08 and in the year 1904-05, Rs. 50 was found to prevail, although these figures are considered too high. A reference to "Area and yield of certain principal crops in India for various periods from 1897-98 to 1911-12" shows that the average yield per acre was 153 lbs. of lint in Assam; 126 lbs. for Eastern Bengal; 70 to 280 lbs. in Bengal or an average of about 175 lbs.; 130 lbs. in the United Pprovinces; between 48 to 140 in the Panjab or an average of 94 lbs.; and up to 106 lbs. in the Central Provinces; 68 lbs. for Madras, and so on.

The whole Indian *average* yield works to 117 lbs. of lint or 468 of *Kapas*. equivalent to 19·2 local maunds approximately. The value, at as 6 per lb. of lint, would amount to Rs. 44.

Room for more mills.

The two mills in Bangalore have together been consuming an average of about 40,000 Bengal maunds of lint per annum, during the decade ended 1910-11, and if the average yield of cotton (lint) for the same period be taken, *viz.*, 89,000 Bengal maunds and the same enhanced by the average quantity of imports, *viz.*, 30,000 Bengal maunds, then, three pairs like the present mills can be kept going, (*i. e.*) there is room for 4 more mills in the State, considered from the point of view of cotton supply alone.

As it is, a considerable portion of this cotton grown in the State is sent to Hubli, Bombay, Madras, Coimbatore and other places, after meeting the local demand. Out of the 1,47,743 Bengal maunds of raw cotton (lint) exported from Davangere, during the year 1911, 31,077 maunds were despatched to Bangalore City, 65,955 to Madras and the remainder to Hubli, Marmagoa, Poona, evidently to Bombay and Jalarpet, etc.

Ginning and Pressing.

Davangere is the only place in the whole Province where cotton is ginned with the help of machinery. There are 9 ginning factories and 2 presses with the total number of 120 double roller gins, 10 single roller gins and 20 saw gins of which 4 are of 70 saws each, 2 of 60 and 14 of 25. There are 2 presses working and one more under construction, for pressing into bales of 400 lbs. size.

The size of the bales pressed by one of the presses is suited for shipment and is $2'-10'' \times 2'-5'' \times 1'-5''$ whereas the size of those from the other press is $4'-6'' \times 1'-6'' \times 1'-5''$.

About 27,000 bales of cotton were ginned during 1912, including some ginned by hand, all the machine ginned cotton having been baled by the presses at Rs. 4 per bale.

The total horse power of all the ginning factories and presses was 490 in 1912 as against 274 in 1910.

Labour and wages.

The total number of coolies working at Davangere was 1864 made up of 894 males, 551 females and 419 boys. Almost all labour is local. Men are paid from 5 to 8 annas per day with an average of 6 annas; whereas women are paid from 3 to 5 annas, average rate being 4 annas.

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* The External Railborne Trade of Mysore by the Director of Industries and Commerce in Mysore 1913.

According to local enquiry, wages 10 years ago were from 1½ to 2 annas for women per day and 3 to 4 annas for men, when ragi was sold at 40 seers a rupee and jola at 30 seers, while the present ragi price is one rupee for 20 seers, which is double the original rate and the wages have risen almost in the same proportion.

Seven hundred and seventy more adult males, 607 females and 1,090 boys are available over and above those required at Davangere, in case a spinning started there and weaving mill be which would require about 955 persons in all.

Crushing cotton seed for oil. "A Suggestion."

Before leaving the subject of cotton at Davangere, attention might be drawn to the possibilities of extracting cotton seed oil from the cotton seed. Every maund of *Kapas* ginned represents about ¾ of local maund of seed. For 1910-11, 17,14,500 maunds of seed should have been available.

The engines of ginning factories have work for only 6 months in the year and it is a point for consideration if some of the more enterprising owners of the ginning factories might not be induced to arrange for crushing cotton seed with their engines during the slack season, with some suitable additions to their plant.

Scope for the operations of a Bank.

Davangere seems to be one of the best places in the Province which will be benefited by the establishment of the Central State Aided Bank,—the Mysore Bank. It appears that the whole of the monetary transactions at Davangere, to the extent of about 60 to 70 lakhs of rupees per year, are being carried on with the help of about 7 to 8 lakhs of rupees, furnished by the local Marwaris.

Cotton Mills.

Binny mills.

The Binny Cotton Mills in Bangalore were started in 1887 with a capital of Rs. 6 lakhs of ordinary shares and Rs. 4 lakhs of preferential shares, with very little Mysore capital therein. There are two departments in the Mills, *viz.*, spinning and knitting.

They consumed about 30 lakhs of lbs. of cotton in 1910-11, at 7 annas per lb. and produced about 26,40,000 lbs. of yarn, of which 2,40,000 were consumed by the hosiery department of the Mill. There are 24,000 spindles for spinning different counts of yarn, only 18,000 of which are working at present.

About 4,800 bales of yarn of 300 lbs. per bale are consumed locally that is, 14,40,000 lbs. were consumed in 1910-11, while about 75 per cent of the remainder is being sent to Calcutta and other places, and the remaining 25 per cent to the *deltas*. Counts of yarn spun is mostly of 19's and 20's, 30's being the highest count spun with the local selected cotton or with a mixture of the local and the imported.

Labour.

Eight hundred coolies are employed between the cotton and the woollen departments at rates varying from Rs. 8 to 8-8-0 per mensem in the case of adult males, and 2-12-0 to Rs. 3-8-0 in the case boys, for half time. Nearly all the coolies are from the Tamil country, North Arcot, practically none of the local people being engaged as coolies.

The mills are contemplating to establish a weaving department of 450 looms, when they would need about 690 weavers, though they do not expect to get this supply.

The Mysore Spinning and Manufacturing Company.

The history of the Mysore Spinning and Manufacturing Company's Mills will serve as an object lesson to promotors of new mills with an insufficient capital.

It was started in the year 1884 as a Joint Stock Company with a nominal capital of Rs. 4,50,000 and Rs. 4,00,000 as capital debt. After working for a period of 9 years, *i.e.*, 1884 to 1893 it sustained a very heavy loss.

The work of the Company was resumed in 1894 with Messrs. Crystle & Co., as its agents, with a nominal capital of Rs. 7,00,000 and a capital debt of Rs. 4,83,500, but in the year 1901 owing to the depression in the mill industry, it went into voluntary liquidation. At this juncture, the Government of Mysore offered to supply the necessary working capital and the work was again resumed under Messrs. Sirur & Co., but after working for 3 years it sustained a loss, but with further struggle, it began to work with some profits. It had thus to contend against various difficulties for 28 years, before it gained a sound position. At present it contains 223 looms and 15,000 spindles and it seems to be under contemplation to add a further number of 100 looms and 3,000 spindles.

Before the improvements in 1905-06, the mills produced 10,99,877 lbs. of yarn and 4,26,306 lbs. of cloth and in 1911-12 the production was 17,98,415 lbs. of yarn and 9,72,815 lbs. of cloth, *i.e.*, an increase of 62 per cent of yarn and 128 per cent of cloth.

The Aryan Hosiery.

This was started in 1907 with a capital of about Rs. 38,000, Rs. 20,000 of which being supplied by the Palace. The plants and buildings are estimated at Rs. 33,000, of which Rs. 23,000 are reckoned for the value of the machinery and Rs. 10,000 for the building. It is owned and worked by Mr. G. Karve. Yarn required is obtained locally, the consumption reaching about 150 lbs. per day. Labour is all local, adult males being paid at Rs. 8 each per month. The quantity of outturn is valued at Rs. 100 a day and is sent to South India and to the East Coast.

Hand Looms.

Statistical information received from the various taluks and sub-taluks in the Province regarding the number of handlooms in working order is not complete. Eight of the 77 taluks and sub-taluks did not furnish information up to the time of this Report being sent to the press and nil statements were furnished by nine *malnad* taluks. The number of handlooms in the Bangalore City,* about 5,000, is taken from a Special Report published in 1906 regarding the condition of handloom weaving there.

The total number of handlooms for cotton and silk from the figures furnished so far, is nearly 23,000; while about 6,100 are engaged in weaving in wool, making a total of nearly 30,000 including those for *navar* or *tape*, *gunny bags* and *hemp* or *pundi*. Distributed by districts, Bangalore district tops the list with nearly 10,000 looms for cotton and for cotton and silk, Mysore district ranking next with about 3,540, Tumkur 2,700, Chitaldrug 2,343 and Kolar 2,082 following in order, while the three *malnad* districts have between themselves about 1,750 looms.

In the Bangalore district, Anekal ranks next to Bangalore City and taluk with 1,210, Dodballapur following with about 1,000. Molakalmuru in the Chitaldrug district has nearly a 1,000 looms. It appears to me that the figures given are below the actuals in several cases and if complete figures be available, the total number of handlooms in the State should much exceed 30,000.

As a matter of fact there were 35,772 looms in 1894-95 paying mohatarfa.†

Weaving in cotton by handlooms.

Weaving in cotton is carried on in all the *maidan* districts of the Province. Nearly 40 per cent of the industry is concentrated in the Bangalore district.

* There were 10,000 looms in Bangalore City, before the outbreak of plague in 1898.

† Page 89, Administration Report for 1891-92 to 1894-95.

The fabrics turned out of these looms constitute mainly †*chires*, *kiriges*, *kanas* both in cotton and silk, *panches* with or without silk border, besides *vastras*, *duppatties* and *checks*. Preparation of *chires*, etc., is concentrated at Bangalore, Dodballapur and Anekal, in the Bangalore district; at Kallur, Tiptur, Chiknayakanhalli, in the Tumkur district; at Molakalmuru, in the Chitaldrug district; while *panches* are manufactured at most of the looms in Melkote, Kikkeri and Hole-Narsipur, in the Mysore district; *duppatties* are woven in Hole-Narsipur and in several parts of the Bangalore and Mysore districts, and *checks* in the Bangalore, Hassan and Kolar districts. **Kinds of fabrics woven and places.**

Yarn used varies with the nature of the cloth prepared out of it. 20s and 30s are most in demand for *chires* ‡ and 40s for an admixture of silk. In the case of most of the *chires* and *panches*, the quantity of yarn used decreases with the increasing count, and in the case of *duppatties*, the consumption is much greater than in the case of *chires* or *panches*. **Counts of yarn used.**

Fabrics from colored yarn with greater or less mixture of silk.

Next to Bangalore City, Dodballapur is the most important weaving centre in the Bangalore district. At Dodballapur there are about 1,000 looms, 650 of which weave cotton *chires*, *keriges*, and *kanas*, with greater or less admixture of silk varying from 5 to 10 tolas for a pair of *chires*. 300 looms prepare purely cotton bordered *chires*, *keriges* and *kanas* and 50 turn out red handkerchieves of 2 cubits square each. **Dodballapur.**

The monthly outturn from any of these looms is 4 *hachadas*, of 2 *chires* (17 × 2¼ cubits) and 3 *kanas* per *hachada* or 8 *chires* and 12 *kanas* in all. The yarn consumed is mostly of 40 counts, dyed blue at Dommasandra at Rs. 4 per bundle of 10 lbs. The annual consumption of the 40s by 500 of the looms is about 60,000, lbs. worth about Rs. 72,000, the cost of grey yarn and charges for dyeing being Rs. 48,000 and Rs. 24,000 respectively. **Silk bordered chires.**

About 93 local maunds of *kora* silk are consumed annually by these 500 looms.

One hundred and fifty more looms use 10 tolas of silk per *hachada*. prepare *chires* from 18 by 2¼ cubits, at 2 *hachadas* of 2 *chires* and 3 *kanas* or 4 *chires* and 6 *kanas* per month per loom. 2 lbs. of yarn of 50s, 2¼ of 40s are consumed every month by each of these 150 looms, making up the total annual consumption at 4,050 lbs. (Hubli 40s) and 3,600 lbs. of 50s (English) valued at Rs. 3,000 for the 40s, excluding Rs. 1,620 for dyeing, and Rs. 4,320 of 50s comprising Rs. 1,440 for dyeing.

The quantity of silk consumed works to about 37 to 40 maunds per year.

The 300 looms preparing cotton bordered colored fabrics consume colored yarn of 20s and 30s, which, at 17·5 lbs. per loom per month, totals up to 63,000 lbs. made up of 23,625 lbs. each of red and blue, and 15,750 lbs. yellow and representing a value of about Rs. 58,275, of which Rs. 4,725 form the dyeing charges for the blue yarn. **Cotton bordered chires, etc.**

Chires are cloths worn by adult Hindu females.
Kiriges „ Hindu girls.
Kanas are bodice cloth.
Panches are cloth worn by Hindu males.
Vastras are upper cloths „ „
Duppatis are thick cotton cloths used as blankets.

The two colors most used are blue-black or *nili* and *laki* or red, almost all the blue yarn used being dyed locally.

Vastras. Every one of the 50 looms for *vastras* turn out 64 red handkerchiefs per month, striped with white, using up 10 lbs. of Turkey red yarn per loom per month or 6,000 lbs. per annum, valued at about Rs. 7,200 in all.

Total and average quantities of yarn and silk consumed. The total quantity of yarn used up at Dodballapur works to about 1,30,650 lbs. per year, valued at Rs. 1,40,000, of which Rs. 21,775 represent the charges for dyeing in blue. 120 maunds of silk are consumed, of which 90 maunds represent the supply of local *kora* silk, valued at Rs. 18,000 and 30 maunds of either Japanese or Italian silk, valued at Rs. 4,500, making up a total of Rs. 22,500.

Quantity and value per loom. It is thus seen that the 1,000 looms use up about 130 lbs. of yarn each, per year, valued at about Rs. 140 and of these 650 use silk, at 156 tolas of silk per loom valued at Rs. 24, also per year ; or in round numbers, Rs. 14 per month per loom, as a general average.

Suggestion. Even assuming that 2 annas per lb. represents the high profits in dyeing of cotton yarn, the 1,30,000 lbs. of colored yarn consumed at Dodballapur would mean a profit of about Rs. 16,250 per year, of which about Rs. 1,425 represents the profits of the locally dyed blue yarn, leaving a balance of about Rs. 15,000, which may have been earned by local men in dyeing yarn, Turkey red and yellow, with a capital of about Rs. 50,000 as estimated by Professor E. R. Watson of Dacca.

Anekal. Anekal is the next most important place where weaving in colored yarn is carried on extensively. There are 700 looms weaving *chires*, *kiriges*, and *kanas*, 600 of which use silk for the border and the others cotton. Counts of yarn from 20s 30s and 40s are most in demand, the last being Turkey red (English) and the other two blue (local).

Yarn and silk consumed and value. On an average, 3 *hachadas* are woven per month per loom or 6 *chires* and 9 *kanas*. The consumption of yarn is 43,500 lbs. of 40s Turkey red valued at Rs. 52,000, 21,000 lbs. of 20s at Rs. 11,750 and 15,000 lbs. of 30s at Rs. 9,650 making up a total of 79,500 lbs. of Rs. 73,600 in value. Out of this, a sum of Rs. 7,200 is estimated as the cost of dyeing 30s and 20s with blue or indigo.

The quantity of silk consumed is 67½ maunds valued at Rs. 10,000.

The 100 looms weaving colored fabrics entirely in cotton, turn out 5 *hachadas* per month of 10 *chires* and 15 *kanas* and use up 8,250 lbs. of Turkey red yarn, 27,500 lbs. of 12s and 6,000 lbs. of 20s, both blue.

Quantity and value per loom. The total consumption of the 700 looms at Anekal would be about 173 lbs. of yarn per year per loom or 14½ lbs., *i.e.*, nearly 1½ bundles per month valued at Rs. 11½. If, to this, be added the value of silk at Rs. 1½ per month per loom, the total amount may be Rs. 13 in all. These figures are somewhat similar to those obtained at Dodballapur.

Chiknayakanhalli. There are 150 looms in Chiknayakanhalli using indigo yarn of 20s and 30s and mercerised cotton for border, the value of the cloth ranging between Rs. 3 to Rs. 5. 19,500 lbs. of yarn are consumed at this place every year, representing a value of about Rs. 18,000 ; besides 67½ maunds of mercerised cotton valued at Rs. 4,725. The average annual quantity of yarn used per loom is 130 lbs., valued at Rs. 120, figures very close to those already obtained for Anekal, Dodballapur etc., and with the value of the silk added, the value of the material consumed per loom per year by the weavers at Chiknayakanhalli rises to about Rs. 150.

Quantity and value per loom.

Remarks. Instances like this might be multiplied. The figures given above refer to a variety of articles prepared and therefore the average struck might be useful in

estimating the quantities of production or value of fabrics from similar looms in other parts of the State.

Fabrics from grey yarn.

Pancheys using only grey yarn and silk, colored crimson, are manufactured on a large scale in a few important centres in the State. Melkote, Kikkeri, Hosaholalu, Hole-Narsipur, Molakalmuru and Hosadurga might be cited as prominent amongst them. **Pancheys.**

The first 4 places are situated close to each other. There are 260 looms at Kikkeri, 121 at Hosaholalu and about 300 each at Melkote and Hole-Narsipur, making up nearly 1,000 looms in all in this region. The 300 looms at Melkote are engaged in preparing *panchays* alone.

Each loom uses up $1\frac{1}{4}$ bundle of 10 lbs. per month weaving about 10 pairs. Total quantity of yarn used up is 45,000 lbs. of 30s, and the total number of pairs of *pancheys* prepared is 36,000. The yarn is all English got direct from the Bangalore merchants.

Almost all the silk used up for these *pancheys* is being got from Japan for the last three years.* The value of the silk as imported is Rs. 62 for every $17\frac{1}{2}$ seers or about $3\frac{1}{2}$ rupees per seer. It is dyed locally in various colors and sold at Rs. 4-8-0 to Rs. 4-12-0 per seer.

The value of the yarn is about Rs. 30,000 and of silk about Rs. 17,500. Thus the total value of the textile and dyeing materials used at Melkote would come to about Rs. 50,000, distributed roughly, two-thirds for cotton and one-third for silk. Similar figures apply to the *panchey* looms at Kikkeri, Hosaholalu and Hole-Narsipur. Value of yarn and silk used.

The total quantity of material consumed by these 1,000 looms may be taken at about $3\frac{1}{3}$ times that used at Melkote or about Rs. $1\frac{2}{3}$ lakhs in value every year, comprising Rs. 1,10,000 for the cotton yarn, about 55,000 for silks and the rest for the dyeing materials. The total production would be about 1,20,000 pairs of *pancheys* or equivalent thereof of fabrics of grey yarn. The quantity of grey yarn consumed in this area would be 1,50,000 lbs. which works to about 150 lbs. per loom per year.

Economic condition of the Weavers in cotton and silk.

There are three systems under which the weavers ply their calling :—

1. Cooly weaving.
2. Contract weaving.
3. Owner weaving.

The contract system is prevalent in the weaving of colored yarn and also of the grey.

There are two sub-systems under contract weaving, according to one of which the weaver is paid from 6 pies to 2 annas per cubit for a cloth of $2\frac{1}{2}$ to 3 cubits in breadth. He weaves from 4 to 8 cubits per day of 8 hours and earns, on an average, from 2 annas up to even 1 rupee under exceptional circumstances. Ordinarily, his earnings range from 3 to 6 annas per day, giving an average of about $4\frac{1}{2}$ annas.

In the other kind of contract-weaving, the weaver is paid a definite amount, varying from 13 annas to Rs. 3 or more per *hachada* of 2 *chires* and 3 *kanas* and

* Originally Swadeshi Mills of Messrs. Tata and Sons were supplying yarn and they were much superior to that from Hubli or from Bangalore.

the earnings in the case of adults will be from Rs. 7 to Rs. 9 and less in the case of boys.

N. B.—According to either method of cooly weaving, the yarn is supplied by the sowcars and the fabrics taken by them and sold.

Illustration. Dodballapur. At Dodballpur the weaver is given the yarn and paid Rs. 1-4-0 per *hachada* of 2 *chires* and 2 *kanas*, which occupies him from 4 to 6 days. Whereas, if he could buy his own yarn and sell fabrics at the most favourable rates, he could get Rs. 1-11-0 per *hachada*, thus effecting an increase of about 7 annas per 6 days or about Rs. 2-3-0 per month.

Anekal. At Anekal, besides 500 owner weavers, there are 150 wage-earning weavers, with 350 people more depending upon them, who do not own looms, houses or lands. These are engaged by about a dozen sowcars who own about 187 looms. Each cooly weaver is paid from Re. 1 to Rs. 2½ per *hachada*, the work occupying him from 4 to 8 days and he thus earns wages varying from annas 4 to annas 5 per day.

Indebtedness of weavers. These coolies were once the owners of looms but are now reduced to this state owing to their having mortgaged their houses, looms and all and are merged in debt, to amounts varying from Rs. 10 to Rs. 100 per head.

The economic condition of the weavers engaged in fabrics using both the coloured yarn and silk is not very different from that of those using cotton alone.

Loss Rs. 2½ per month per loom. It is invariably found that the price they pay for the yarn at credit rates is at least 8 annas per bundle of 10 lbs. more than for ready cash. Moreover they are made to sell their woven fabrics to the money lender at a reduced price of at least 4 annas per *chire*, which in the case of 8 *chires* they produce per month would amount to Rs. 2, that is, the weaver loses Rs. 2½ actually per month, as he could not manage to get the yarn at wholesale price and sell his wares at the most favourable rates.

Hosaholalu. H.-Narsipur. At Hosaholalu, where silk-bordered *pancheys* are prepared, the people are paid regular wages varying from 4 annas to 8 annas, depending upon the nature of the work entrusted to them, while at Hole-Narsipur, both the cooly weaving and the contract system of weaving, as described above, are in vogue.

Magadi. At Magadi the yarn dealer sells counts of 30's and 40's, dyed blue locally, at Rs. 9-6-0 per bundle of 10 lbs., whereas it costs him actually Rs. 6-14-0 at Bangalore at wholesale rates, Rs. 1-8-0 more for dyeing the 10 lbs., and annas 3 and pies 6 for transit charges, making up a total of Rs. 8-10-0 and his gain on a bundle of 10 lbs. is 12 annas. If the weaver buys 2 bundles per month, he loses Re. 1-8-0 in the purchase of yarn alone. There are 192 looms in Magadi consuming yarn at about this rate and the total loss to the weaver population is about Rs. 300 per month or Rs. 3,600 per annum.

Total annual loss sustained by weavers.

N.B.—The gain of 12 annas on every bundle of 10 lbs. bought on credit works to about 8·7 per cent per month or over cent per cent per annum.

Kallur. At Kallur, the weaver pays Rs. 8-6-0 per bundle of 10 lbs. of 30's dyed blue at Dommasandra, whereas its actual price is Rs. 7-13-0 at Dommasandra, Rs. 7-15-0 at Bangalore and Rs. 8-2-0, for cash at Kallur. The difference of 4 annas between cash and credit rates amounts to a little over 3 per cent for a month of cash sales, which cash rates already include the profit to the dealer. On a total quantity of 240 bundles consumed per month at Kallur, there is a total loss of not less than Rs. 60 and the cost of the yarn would, even at the cash rates, amount to Rs. 1,950 or Rs. 2,000 in round numbers, that is, they are making an extra profit of Rs. 60 on Rs. 2,000 or 3 per cent per month.

Total loss to weavers.

At Hole-Narsipur, 4 annas is the charge on a bundle of 10 lbs. worth about Rs. 7-4-0 with profit and the loss to the weaver is somewhat similar to that at Kallur. Even at Melkote where there is a co-operative union composed mostly of the weavers, the yarn sold at Rs. 7-3-0 at Bangalore is sold at Rs. 7-7-0 at Melkote, although the actual charges per bundle and profit do not amount to more than 2 annas. Even the smallest increase of one anna per bundle for cash purchase and 2 for credit at Anekal are found to work to the usurous rate of interest of 18 and 36 per cent respectively per annum.

H.-Narsipur and Melkote.

There is another avoidable source of loss to the owner-weaver in the purchase of yarn especially in the purchase of colored yarn. Yarn of the same color sold by several firms and with different fastness of color is sold at varying rates. In the case of the Turkey-red, the prices in the mofussil vary from Rs. 4-3-0, 5-6-0 and 5-15-0 per half bundle of 5 lbs. and the weaver is at the mercy of the dealer as to what mark of yarn he is actually supplied with. There is nothing to prevent the retail merchant from passing yarn valued at Rs. 5-6-0 for one priced at Rs. 5-15-0, and it appears that some of the dealers at Chamarajnagar pass off bundles of Turkey-red yarn costing Rs. 4-6-0 to 5-0-0 per 5 lbs., for those valued at Rs. 5-12-0 and Rs. 6-0-0 and the 40's grey of Rs. 7-8-0 per bundle for one of Rs. 8-8-0.

Loss in purchasing colored yarn.

Some system might be devised which would enable the weaver to distinguish between the various qualities of colored yarns sold at various rates. Such information might be diffused broadly among the weavers and in person by the Associates of the Conference, the Members of the District Committees and specially by an itinerent officer, fully posted up with the latest commercial intelligence on the subject and who is fully imbued with the necessary earnestness and zeal.

Suggestion.

There is still another source of loss in the form of sharp practice by some of the unscrupulous mofussil dealers. At Grama in the Hassan taluk, one such replaced 3 to 4 hanks of 20's by an equal number of 22's. He gains thereby, as he pays only 4 annas extra for a bundle of 22 counts over and above that of 20's while he pockets the value of 2 extra hanks, which is in excess of that amount. The weaver, on the other hand, not being able to detect the difference in fineness of the yarn, as between 20's and 22's, loses as regards the quantity of yarn supplied to him. The quality of fabric prepared will also be deteriorated owing to the variations in the counts of yarn.

Another source of loss.

The same agency as was suggested already might enlighten the weaver on this point also by actual demonstration and devise a simple method of detecting such exchanges by actual weighing of the suspected bundle or hanks.

A suggestion.

The cumulative loss to the weaver is something very considerable to him, and I estimate that this is not less than 30 per cent of his present actual monthly income and it is fully avoidable. The system prevailing now seems to have been in vogue for not less than a generation and perhaps more and it is no wonder that the weaver's position has been steadily going down. Foreign yarn has brought about the existence of agents and sub-agents for the wholesale dealing in yarn and the yarn has to pass through several hands before it reaches the consumer.

Suggestions.

In order to minimise the sources of loss to the weaver and to increase his income, I would suggest a Scheme, the main points of which are :—

(1) Co-operation among the weavers must be introduced and that by Government taking very active steps in the beginning ;

(2) Government must also closely watch its working, till the weavers are able to manage the movement themselves;

(3) It must be worked through the local authorities in the beginning and under the guidance of the District Committees of the Conference;

The money required to purchase the raw materials, for two months' working, should be advanced to the sowcars on their joint security and the amount should also be enough to supply the weavers with the shuttle looms, together with the appliances for warping and sizing, at least one set for each weaving centre; About 12 per cent interest per annum should be charged on the cash and wholesale prices of the yarn as it is supplied to the weaver, the money being advanced to the Sowcar at interest not exceeding 6 per cent, the balance of the interest being allowed in favour of the sowcar for his trouble;

(5) The articles produced by the weaver to be sold by the sowcars at market rates at the time of sale and on a small commission of not more than 4 per cent on the market value of the goods, this market value being determined, now and then, by a special punchayat from among the co-operative weavers and the sowcars;

(6) The co-operators to be benefited by the movement should accept the condition that not less than 50 per cent of the increase in the income over and above their present earnings should be deposited in their respective names at the nearest Government Treasury and they should be prepared to assent to any arrangement that might be made to enforce the conditions laid down above.

(7) And this arrangement to continue till the accumulated savings of the weavers, as indicated above, amount to a sum of about Rs. 150, in all for each weaver, so as to enable him to discharge his previous debts, to pay of his share of cost on the improved appliances and to provide himself with a working capital to purchase the raw materials for 2 months' working.

Special feature of the suggestions.

The system as outlined above is suggested to improve the condition of the weaver and its most important feature is that it aims at giving a finality to the attempts to help him and is intended to enable him to be free, once for all, from his pecuniary difficulties and to lay by enough to facilitate him to ply his trade to the best advantage. The sowcars * would also be getting a decent profit on a capital, which is not their own.

By the system proposed, they are not left out in the cold, in which case they would probably work against any proposals to improve the condition of the weavers. The Government would also be assured of getting back the money to be lent to the weavers through the sowcars.

Anekal sowcars in favour.

Some of the important sowcars at Anekal have come forward to partake in a movement of this nature and are of opinion that it would be a work that would bring advantage to all the parties concerned.

Reasons for including sowcars in the scheme.

Another reason why the sowcars are included in the Scheme is that they own property and houses and can be entrusted with the amount required for each Weaving Centre, without any apprehension of loss being sustained, They are business men. They know the weaver population and their ways and the money

* *N. B.*—Many of these so called sowcars in many parts of the State are not really rich. They often borrow from Marwaris at high rates of interest and have to charge still higher rates to the weavers and others to get a profit for themselves.

that would be entrusted to them would therefore be safe. Whereas, individual weavers, with their want of business habits, would be unable to manage the business and cannot be entrusted with the handling of comparatively large sums of money. By thus providing for the sowcars partaking in the gains, the system would secure the advantage of utilising the existing local business instinct, talent and experience to the best possible advantage and the agency lending money, Government or private, will be dealing with a set of more enlightened men.

How the money is to be utilised.

The money to be advanced should be utilised in organising Co-operative Stores for the special benefit of the weavers. The sowcars should be entrusted with the work of collecting the share value and of repaying this in turn to Government or Bank. The Stores should include all the weaver's requisites for his calling and also provisions and should take back the fabrics woven and arrange for their being sold at the various *Santes* by special trustworthy agents.

The details of the scheme will have to be worked out and special provisions to be made to guard against any possible defeating of the main objects for which the movement is to be started.

Some checks.

Accounts should be kept up in proper form and in full detail. The Deputy Commissioner and the Amildar should have full power to inspect the accounts at any time and without notice, besides the usual departmental check by the Registrar of Co-operative Societies.

The Maharaja's Mills to supply yarn under special conditions.

In connection with the suggestion regarding the supply of cotton yarn to weavers by organising Co-operative Stores, I would add another as to the desirability of inducing the local mills to supply yarn to meet the local demands. The special relation in which the Maharaja's Spinning and Weaving Mills stand to Government might be utilised and they be requested to manufacture such counts of yarn as may be required by the local weavers and to supply such quantities annually as may be consumed by them. The value of the yarn to be supplied should be equivalent to the instalment payments towards discharging the debts contracted from Government.

A point in favour.

I anticipate a number of difficulties in the way of giving effect to these suggestions. One important point in favour of the proposal is, that the Government need not spend a fresh amount to advance money to the weavers to start Weavers' Co-operative Stores, inasmuch as the bulk of the Stores would consist of cotton yarn, which, it is suggested, might be supplied by the Maharaja's Mills, in the manner outlined above.

Fly Shuttle Looms.

There are a few fly shuttle looms here and there in the Province. Some have been introduced into Mysore from the Mangalore side but their number is small.

Production could be doubled of *duppatties*, and *pancheys*.

It is eminently adapted to the weaving of coarse *duppatties*, *pancheys*, and checks. The *duppatties* which are now woven in parts of the Province are stitched together in order to increase their breadth. This double labour might be saved by the introduction of the fly shuttle looms and the production would practically be doubled if the whole breadth be woven at once. The rapidity of the work with this loom will thus increase the quantity of production by 50 per cent and more. The introduction of fly shuttle sleys, as adapted to pit looms, would generally enable the weaver to earn at least 50 per cent more than what he is earning now. At Hole-Narasipur, *pancheys* with silk borders up to 1½ inches in breadth are being woven in pit looms with fly shuttle arrangement and the production has increased by 50 per cent of what it was before; and even a wage earning cooly gets 50 per cent

more per day, than what he was getting otherwise. In the case of *pancheys* with silk border, less than 1½ inches, the weaving with fly shuttle loom would be easier and the production greater and if the Japanese silk free from knots, be introduced, weaving of *pancheys* as it is now done at Melkote, Hosaholalu, Kikkeri, Holenarasipur and other places, will give less trouble.

Also of some *chires, kiriges* and *kanas.*

Weaving of *pancheys* of lower counts of yarn with cotton borders could also be very easily accomplished by a pit loom with fly shuttle arrangements. In the case of *chires*, *kiriges* and *pancheys* with cotton or silk border within 1½ inch or 2," a pit loom with fly shuttle attachment would prove very effective and enchance the production by 50 per cent.

Chief fabrics from country looms.

The fabrics enumerated above constitute the major portion turned out by the country pit looms. An attempt to popularise the use of fly shuttle looms among the weavers of such a class would result in substantial good to the industry.

And no cooly weaver from outside the State is needed to be brought in.

Outside weavers not required.

The weavers who really stand in need of help now could be helped.

Side by side with the attempts at popularising the use of fly shuttle looms by peripatitic demonstration parties, small workshops should be organized in the various important weaving centres to manufacture cheap types of fly shuttle looms as adapted to pit loom-weaving and the looms supplied to the weavers at the actual cost.

Industrial schools, should be organizsed in *all* the important weaving centres, the schools being devoted mainly to weaving, with carpentry and some smithy as adjuncts. Attempts should be made in these schools to use the fly shuttle loom and to improve the types of warping and sizing. A few of the working hours in these industrial schools might be devoted to the teaching of the arts and some time must also be alloted to diffusing commercial information or intelligence, regarding the weaving industry in general, such as price of yarn and of cloth.

Some difficulties.

Some of the difficulties incidental to the introduction of fly shuttle sleys are :—

(1) Increase in the quantity of yarn required and greater dependence of the weaver upon the sowcar for his supplies.

(2) Re-spacing of the present accommodation to suit to the width of space required for a fly shuttle loom.

(3) The indifference of the weaver population.

(4) Want of freedom of the most of the weavers to buy the loom and improve their position.

Lessons from previous attempts at helping the weavers.

In connection with the suggestion offered to improve the economic condition of the weaver, it would be pertinent to refer to the past experiences and failures sustained by Government or by private individuals. A cloth merchant in Mysore was helped substantially by His Highness the late Maharaja Chamarajendra Wodayar Bahadur to start the manufacture of fine Salem cloths in the Mysore State. Government gave him a loan of Rs. 40,000 to be paid in annual instalments. A futher loan of Rs. 30,000 was advanced by the Palace authorities, with the stipulation that the money was to be paid back in the shape of cloths to be supplied for the use of the Palace. The undertaking failed in a few years, with a complete financial disaster to the merchant's family and with some loss to Government. The main cause of the failure was that the organizer had no knowledge of the process of weaving and consequently could not get proper work out of the weavers got from Salem.

The weavers of Saligram started a co-operative concern and invested about Rs. 2,500 in the purchase of Syajee looms, construction of buildings etc., but the enterprise failed for the same reason, viz., weavers have been imported from outside the State, without a proper management or effective supervision over their work. **Saligram.**

A weaving factory started at Tumkur failed for a similar reason. **Tumkur.**

But these defects could be remedied now, since a Department for Industries and Commerce has been established. With the technical help of this department it would be easy to manage to secure efficient supervision over the work of outside workmen, even supposing it is found necessary to introduce them once more before the local weavers are fully trained to the use of the fly shuttle slay and to the other improved appliances for warping, sizing, etc. **All past failures could be avoided.**

This training of the local men should be the main and immediate work to be undertaken. **Local men to be trained first.**

Bangalore is the largest weaving centre in the Province and the industry seems to thrive better here than in any other locality in Mysore. The manufacture of pure cotton cloths such as *chireys*, etc., is small and the bulk of the goods woven consists of silk bordered *chireys* and *kanas*. Cotton *vastras* keep a few of the looms working. *Pancheys* are not woven as they leave very little margin of profits and are mostly imported from Salem and other places. **Cotton weaving in Bangalore.**

20's, 30's and 40's counts of yarn are largely used. Bulk of 20's is supplied by the Maharaja Mills and 30's by the Binny. 40's to 70's yarn is imported for fine goods. **Raw materials.**

The yarn from the mills is reeled into hanks and made into bundles. The weavers separate the hanks and wash it before winding. The hank is wound on a reel called *arate*, turned by hand. This work is either done by women or boys, and is paid at one pie per five hanks. **Preparatory processes. Cotton yarn.**

A woman earns one anna four pies per day. This wage is low but is earned indoors which is an advantage. **Winding and wages**

The thread is then warped on a warping frame (ಹಾಕಹೊಯುವಹಲಿಗೆ) with a number of upright pegs.

Warping wages amount to one pie per 5 hanks, and takes about a day for warping yarn for two *sadis*. Some women warp the yarn direct from the hank, omitting the winding processes and save about half the time. But the warp prepared will be defective, as regards the tension on the various threads. **Warping and wages**

The size is prepared from rice flour and is applied with a brush, a little cocoanut oil being used. The advantage of hand-sizing lies in the fact that the yarn is well brushed when the yarn is saturated with *conji* and oil. This process takes about a couple of hours and when paid on piece work costs 2 annas and 8 pies, usually, for 2 *sadis*, including cost of material. **Sizing and wages.**

The total wages earned in these processes amounts to about annas 5 and pies 3, for 2 *sadis* or *chireys*. **Weaving.**

The winding and warping charges for silk borders is pies 6 per tola.

The weaver takes about 3 hours to twist the warp ends to the existing ends in the healds and reeds according to pattern and from 5 to 22 days to weave 2 *sadis*, according to quality and value.

The wages earned range from annas 4 to 6½ per day.

Profits of the retail Dealer,

The retail merchant buys yarn at rates of Re. 1-2-5, 0-12-10 and 0-9-0 per 40, 20 and 24 hanks respectively of red, blue and yellow and charges the weaver at Re. 1-9-9, 1-1-6 and 0-11-0 for warp and if annas 5 and pies 6 be deducted as the cost of preparing warp, then the total retail price for the yarn detailed above is Rs. 3-0-9 and his profits on Rs. 2-8-3 amount to annas 8 and pies 6 or about 20 per cent.

The profits on grey or coloured yarn when sold in retail vary from 10 to 20 per cent, besides that in dyeing and in selling of cloth.

CHAPTER III.

SILK.

Silk is the most important textile raw material produced in the State. From information available so far, it has been ascertained that the total value of the annual production of silk approaches to a figure between 80 lakhs to nearly a crore of rupees.

Kind of silk.

The silk produced is all mulberry silk and there is no Eri silk. The worm is polyvoltine or multivoltine, similar to the Bengal silk worms, and different from the uni-voltine varieties of France, Italy or Cashmere.

Three silk tracts.

The industry is confined to the 4 out of the 8 districts of the State, namely, Mysore, Bangalore, Kolar and Tumkur. The *malnad* districts, namely, Shimoga, Kadur, Hassan and the forests tracts of the Mysore district and the Chitaldrug district do not support the industry.

There are three distinct areas or tracts where mulberry is cultivated and cocoons reared, *viz.*, the Chamarajnagar—Chennapatna tract, the Chennapatna—Kunigal tract and the Chikballapur—Kolar tract.

These are indicated on Plate II, Part I.

The first comprises the northernmost portion of Chamarajnagar, the plain area of Yelandur Jahgir and reaches up to Chennapatna, *via.*, T.-Narsipur and Maddur, while the Chennapatna tract works into the southern half of the Kunigal taluk, *via.*, Kempanahalli. The smaller tract comprises the northern half of the Hoskote taluk, eastern half of Devanhalli and more than ¾th of the southern area of Chikballapur, with the whole of the Vemgal hobli, Kolar taluk besids other areas of Kolar.

Area under mulberry.

From the latest district returns specially collected, it can be seen that over 33,300 acres were under mulberry cultivation in the State during 1911-12. About 75 per cent of this area, *viz.*, nearly 25,000 acres are in the Mysore district; about 7,000 acres in Chamarajnagar, 6,500 in T.-Narsipur, nearly 5,000 in Yelandur, 2,700 in Mandya, 1,750 in Malvalli, Gundlupet returning only about 57 acres. Out of the remaining one third, nearly 4,000 acres are returned by the Bangalore district, a little over 3,000 by Kolar and 1,400 by Tumkur, mostly from Kunigal.

Chennapatna including Closepet is the most important silk taluk in the Bangalore district, next follow Magadi with 770 acres, Kankanhalli with 400, Hoskote with about 350 and Devanhalli 240; Dodballapur, Anekal and Nelamangala making up the rest. In the Kolar district, about 1,500 acres are returned by the Kolar taluk, about 1,000 by Sidlaghatta and about 350 by Chintamani; Chikballapur, Srinivaspur and Malur making up about 200.

The actual total area will be even more, since the figures for the districts are not complete.

Division of labour in the industry.

There is a well marked division of labour in the silk industry. Mulberry cultivation is exclusively taken up by many of the ryots; there are others who make the rearing of cocoons their speciality. There is still a third set of people more often Mahomadens and Holeyars—other than caste Hindus—who buy the cocoons and reel the silk.

Production of seed cocoons is not specialised to such an extent as the nature of the case demands. Some of the cocoon rearers in places like Magadi, Closepet

and Chennapatna, pay some attention to this portion of the work and supply all the rearers with seed.

The mulberry cultivator and the cocoon rearer often live in the same village or very near each other, whereas the reelers live at convenient centres and ply their trade.

Some numerical relations.

From enquiries made it is found that a more or less definite numerical relation subsists between the quantity of silk reeled and of the cocoons required to yield that quantity; whereas such ratios are not constant or uniform in others, such as, between the quantity of cocoons and the weight of leaves required* to rear these cocoons or between the quantity of leaf produced and the acreage under mulberry.

Quantity reeled and reeler's income.

On an average, one pound of silk is produced from reeling 14 pounds of cocoons, and one reeler can reel about 2 seers of silk per day, that is, one and one-fifth pound, after spending about 11 annas for cooly and 5 annas on fuel and realising a gross income of about Rs. 10 or about Rs. 5 per seer and a net income of about annas 8 per day, after paying away Rs. 8-8-0 towards the value of the cocoons purchased. In a cycle of 40 days, he reels off 48 lbs. of silk consuming 672 lbs. of cocoons, *i.e.*, about $67\frac{1}{5}$ lbs., from each of 10 families of cocoon rearers, and, at this rate, earns about Rs. 100 per year of 200 days.

Cocoon rearer's earnings.

The value of the cocoons raised by a cocoon rearer in a cycle of 40 days is Rs. 34, of which he pays about Rs. 10 to the mulberry cultivator for the leaf and about Rs. 2 for the seed, thus making a clear profit of about Rs. 22 for 40 days or Rs. 110 per year of 5 cycles of 200 working days. The mulberry cultivator gets about Rs. 10 for each cycle, or Rs. 50 for the year.

That of the mulberry cultivator

It is thus seen that the cocoon rearer benefits most by the industry and the mulberry cultivator the least. But very often these two are combined in one family.

The profits of the silk reeler will rise in proportion to the market value of silk, even after paying a proportionate amount to the cocoon rearer.

Small export of cocoons.

The whole of the cocoons produced in the State is not reeled off. A small portion of the cocoons reared round about Chennapatna and Maddur is sent to Berhampore in Bengal, for being reeled there. Before being sent, the cocoons are dried in hot-houses, specially constructed for the purpose. There are 2 such hot-houses in Maddur, one of which can hold 200 trays at a time of 400 *kahans* of 1,280 cocoons each. The capacity of the other hot-house is $2\frac{1}{2}$ times that of the first. It can hold 1,000 *kahans* or 500 trays. After 10 hours of coal heat of 160°F, the cocoons are ready for being filled in gunny bags and exported. By this means, there is a saving in the weight of transport by 75 per cent.

At Vadigenhalli, Devanhalli taluk, one merchant works 8 reels by the ordinary method and he wishes to introduce power.

There is also a press at Maddur for pressing silk waste into 300 lbs. bales. Five to six bales are pressed in a day of $8\frac{1}{2}$ hours with the help of only 5 or 6 coolies.

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* *Quantity of leaf per acre.*—The quantity of mulberry leaf from one acre varies from 150 to 200 local maunds, in parts of Kolar district made up of from 50 to 80 bags of 3 maunds per bag. The leaf is made up of $\frac{2}{3}$rds of twigs and $\frac{1}{3}$rd of actual leaf and will fetch Re. 1-8-0 to Rs. 2 per bag of 3 maunds.

At Kempanahalli, Kunigal, the quantity of leaf from the plant decreases at each cutting, the plant being fully trimmed after three crops. The rate of yield of leaf in this area is about 320 maunds per acre, made up of 160 of bags and 2 maunds each and valued at Rs. 100. One bag of leaf feeds about 3,500 worms which yield about $3\frac{1}{4}$ seers of cocoons.

Qualities of Mysore silk.

The main qualities of the Mysore silk, *viz.*, brilliancy and strength are highly appreciated and valued, not only in India, but also in foreign markets. It is often stated that the European markets would readily absorb any quantity we can produce, that Mysore silk is entirely free from breaks and that the general processes of reeling, as practised in Mysore, meet with the approval of foreign experts, though the blemishes and defects noted are believed to be merely subsidiary and avoidable. It is also believed that the shine or gloss of the Mysore silk is increased by dyeing.

Some remediable defects.

Some of the remediable defects noted in the Mysore silk are :—(1) the presence of numerous knots in the yarn, (2) the loss of weight, by nearly one-seventh of its original weight, in the course of boiling during dyeing and (3) it is mainly yellowish in colour and not white. It is believed that all the defects could be eradicated by careful selections of seed and by effecting some improvements in the process of reeling.

Favourable trade conditions.

The trade conditions are also favourable. The trade is established on a firm basis in countries where the three following conditions co-exist : the raw material must be produced in the country, there must be manufacturing skill and a demand for the produce. All these three conditions do co-exist in Mysore, the people have acquired an accumulated experience of about a century in every sub-division of the industry, *viz.*, mulberry cultivation, cocoon rearing, silk reeling and breeding of seeds and the industry is well established. They have acquired the necessary skill in the various processes of silk weaving. There is extensive demand for the *Kora* silk in India itself, as attested by the fact that the Madras districts alone consume a great portion of the Mysore product, *i.e.*, to the extent of about 35 lakhs a year on an average. In addition to these advantages of accumulated experience, manufacturing skill and ready demand for the silk both in India and in foreign countries, there are several other points which warrant serious attempts being made to improve the industry and to extend it.

Profits comparatively large.

Sericulture is more profitable than many other agricultural industries. The mulberry grower earns about 50 rupees per year for every acre of the plant. The cocoon rearer gets a net income of not less than Rs. 110 a year by his calling, while the silk reeler about Rs. 100 per year as his net income, and these earnings are very respectable for people living in rural tracts.

Outlay proportionately small.

One other equally important advantage in this industry is that it is a cottage industry of very little or no initial outlay and can be taken up as one subsidiary to agriculture and therefore can be carried on over extensive tracts of country, which are otherwise favourable.

Women find a place.

Wemen find a place in this industry and this is a special feature to recommend it for improvement or extension. It is admirably suited to the women of this country, many of whom cannot work out of doors.

Soil and other conditions.

All soils are more or less suited for mulberry cultivation, and so sericulture could be introduced into new localities, though only the best and richest lands should be set apart for this, considering that the crop is perennial and is also valuable and, if irrigated, two more crops of leaves with two more crops of cocoons can be obtained.

Meteorological conditions favourable.

As regards the meteorological conditions of temperature, rainfall, etc., several tracts of Mysore, especially in the maidan parts, would be found suitable. It appears that the temperature most suited to man is also most suited to rear silk worms. They are at the optimum temperature if they can be kept day and night at 75°F. But it is practically impossible to secure this uniformity. A limit of 70° to 80° should not be exceeded and great differences of temperature between day and night must be avoided.

The atmosphere must be free from dust and impurities and the tract should be free from strong prevailing winds or prolonged heavy down-power of rain*

Any attempt at expanding the industry should be confined to the silk tract and to other open parts of the Hassan and Mysore districts.

Areas in the State suited for sericulture.

It is clear that the meteorological conditions of the *malnad* proper, constituting the western tracts of Shimoga, Kadur, Hassan and Mysore are unsuited for sericultural operations. The heavy down-pour of rain in these *malnad* tracts renders cocoon rearing almost impossible for nearly half the year. The general impurity of the air and the scarcity of population do not favour the industry in the other parts of the year. Consequently attempts at extension should be confined primarily to the "Silk Tracts" of the State and secondarily to the remaining open portion of these four districts, and the open parts of the *malnad* districts. Chitaldrug from its higher temperature and dificiency of rainfall seems to be unsuited for sericultural operations, but attempts might still be made at introducing the industry in some favourable localities in that district as well, such as round Harihar, Davangere, etc.

Preliminary difficulties and steps necessary

There are some preliminary difficulties to be overcome before any extension is attempted. Almost all the Amildars of the silk rearing taluks of the State draw prominent attention to a wide-spread disease among the worms as militating against attempts at extension of mulberry cultivation and of cocoon rearing. This point has therefore to be gone into at first and the actual disease ascertained and eradicated. Some of the old writers including Mr. Mukerjee were spreading the opinion that Mysore silkworms were remarkably free from disease, especially *pebrin*. But it is now freely stated that pebrin or some disease is prevalent in the silk areas of the State, and people confirm the existence of a disease and unless and until the people are assured of the eradication of all diseases of silk worms and of the ready, abundant and cheap supply of healthy seeds, no improvements in the expansion of the industry would be possible.

Seed-rearing establishments to be started.

Grainages or seed rearing establishments will have to be started at convenient centres, after a study of the existing diseases of the worms. Mr. Mukerjee estimates the initial costs of establishing a *grainage* capable of supplying over Rs. 1,000 maunds or 80,000 lbs. of cocoons per year, at Rs. 2,400 and the working expenses at Rs, 1,500 per year and that the annual outturn may be safely put down at about Rs. 4,000 with a maximum of Rs. Rs. 8,800 and states that "in France, Italy, etc., several *Graineurs* have grown enormously rich and that, as a result of the working of the grainages, the silk industry in Europe has revived completely within the last forty years. He further states that in this country, if properly organised grainages were to be established, men belonging to the upper classes of society will have to engage in agricultural pursuits as the capital outlay required for the establishments of grainages is much beyond the means of the ordinary cultivator. But, as Mr. Mukerji rightly deplores, high-caste men have neither the inclination nor the aptitude for this pursuit, and consequently, the

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* A study of the annual rainfall reports of the various silk taluks for 40 years from 1870 to 1909 shows that the mean annual rainfall of these taluks ranges from 24 inches in Chamarajanagar to nearly 27 in Nanjangud, to 28 in T.-Narsipur, 29 in Mandya and 35 in Channapatna. Chintamani and Sidlaghatta in Kolar have a mean annual rainfall of 27 and 28 inches respectively. In the Bangalore district, Kankanhalli has 28 inches and Magadi about 31.

The distribution of rainfall in the form of mean monthly figures is practically the same in these various taluks and the divergence noticed here and there does not exceed by more than 2 inches in any one month.

serious work of improving the conditions of this very large and profitable industry should not be left to the experiments and chances of the private capitalists of indifferent aptitude for a practical and a very important work of this kind.

By Government first.

It appears very clear that Government should have to pioneer the starting of *grainages* and demonstrate the immense advantages and likely profits of such establishments. Considering that the cost of establishing a *grainage* on a small scale and running it for about five years till satisfactory results are obtained would not exceed Rs. 10,000 and considering the magnitude of the industry and the immense advantage likely to result from such experimental measures, the expenses would be comparatively trifling, even supposing that the experiments do not bring in any return, in the shape of money or beneficial results. But, as a matter of fact, the *grainages* are supposed to be very profitable concerns in themselves.

Work urgent.

The work is urgent in order to infuse confidence in the people, as they are very much depressed owing to the spread of disease among the worms and many of them are thinking of giving up mulberry cultivation and silk rearing, in favour of other, more certain, though less remunerative pursuits.

Improvement of irrigation facilities.

Another measure to improve and expand the industry is the provision of increased facilities for irrigating mulberry lands, since irrigation would increase the number of crops of leaves and of cocoons by 2, that is, by 40 per cent of the present assumed average of 5 crops of cocoons. But what is more likely with the increased facilities for irrigation is that the area under mulberry would be increased as well and with it the silk production. The magnitude and urgency of the work warrant personal inspection and enquiry into the subject of affording increased irrigation facilities.

Fine reeled Mysore silk in demand in European markets.

There is another point which requiries to be noticed in connection with the suggestions to improve and expand the silk industry in the State. It appears that the Mysore silk, reeled fine, without knots and other blemishes would fetch as much as 17s per pound in the European markets, *i.e.*, Rs. 12-12-0 or an increase of nearly 50 per cent over the present price. The services of an expert should be engaged to introduce improved methods of reeling, so that the yarn might be free from knots and be uniform. This is very important and has to be done.

Local re-reeling of silk to be extended.

It appears that the *kora* silk consumed locally and outside, in India, is being re-reeled at a cost of about a rupee per seer by women of the weaving community and that the silk so re-reeled could be sold at a couple of rupees more per seer. Attempts, therefore, might be made at introducing this re-reeling extensively into the Province, so as to afford increased employment to the female population of the ryot class.

Dyeing of silk.

Dyed silk fetches an increased price of about a rupee per seer over and above the cost of dyeing. The starting of one or more dye houses for dyeing local silk is another important step towards finding more employment to Mysore people. The large annual export might consist of dyed silk, instead of the *kora* as at present.

Spinning waste silk

Last and not least, spinning of *waste* silk might be attempted. This would not only stop the export to Italy and France of waste silk but would tend to enhance the value of that silk by about 4 times its present value.

It appears that a mill to spin waste silk could be established at a cost of about 3 to 5 lakhs of rupees. It appears also that the process of spinning the *waste* silk is kept a profound secret.

Considering the four fold value of spun silk as compared with that of the waste, it is very desirable that an expert is engaged to study the question and to report on it.

Diffusion of special-know-ledge.

Another line along which improvement could be effected consists in diffusing among the rearers of silk worms a knowledge of some facts concerning the healthy propagation of the worms. There are a few fundamental principles of sericulture enunciated by Professor Maillot, a great French authority on the subject. According to that Professor, each house should rear only a *small* number of silk worms and that the greater the number of the houses engaged in sericulture consistent with keeping the village air uncontaminated, the better it is for the industry but only the silk worms should be drawn from healthy seed.

If, however, *every* cultivator goes in for silk worms, then, it appears that the whole village becoms unsuited for sericulture by reason of the air getting contaminated with the germs of the silk worm disease.

He draws prominent attention to a general law that man is not able to grow only one kind of crop from one tract or country for an indefinite period of time consistent with profits, without making that tract gradually more and more unsuitable for that crop.

The reported immunity from disease of the Mysore silk worms some years ago and the present widespread appearance of disease may probably be explained as being due to the likely ignorance and consequent neglect of this principle, on the part of the rearers of the Mysore silk worm. In any case these principles require wide diffusion among the people engaged in sericulture.

Training schools to be established.

Lastly Training Schools may have to be established, as in France, to train local men in the propagation and selection of healthy seeds. Such trained men might thereafter be attached to village schools, where they will rear silk worms for seed, on rational principles, and thus bring the knowledge home to the villages, besides imparting a course of instruction to the boys.

Eri cocoons.

Some special advantages.

If a mill be established locally to spin waste silk, it would very much facilitate the introduction of the rearing of Eri-silk worm in the State, inasmuch as the Eri cocoons cannot be reeled as mulberry cocoons but have to be carded combed and spun like cotton. Such an introduction of Eri silk cultivation has other and special advantages in its favour. It is easier to rear them than the mulberry cocoons. They spin cocoons in 14 or 15 days, whereas mulberry cocoons require 40 days. The Eri cocoons feed on castor leaves and cattle do not feed on them so readily as on mulberry.

Rearing of Eri worms is admirably adapted for beginners in sericulture, as the worms are larger, hardier and easier to handle. It would meet with the special approval of the entire Hindu Ryot population, as the cocoons are not steamed and the chrysalis killed as in the case of mulberry cocoons.

The introduction of Eri worms might precede the introduction of sericulture in new areas, and mulberry worms introduced thereafter, if neceassary, inasmuch as both the mulberry and Eri cocoons are reared in much the same way.

Eri-cocoons can be pressed and baled.

The absence of spinning mill or other facilities for carding, combing and spinning the Eri cocoons need not deter people from attempting their introduction into new areas, since the cocoons admit of being pressed and baled and sent to Italy or France for being spun. Thus an export trade could be developed even though cardiaries be not established to spin Eri cocoons.

Yield of eri cocoons per acre of castor.

It appears that one acre of castor will yield from 60 to 90 Bengal seers, *i.e.*, 120 to 180 lbs. of cocoons valued at about Rs. 60 and that women in Bengal produce from 10 to 12 rupees worth of cocoons per year with very little effort and that

after attending to all agricultural pursuits. As Eri cloth is summer wear for Europeans in India, its price has risen from Rs. 3 or Rs. 4 to Rs. 15 or 20 at present. Seeing that the castor plant on which the worms feed is extensively cultivated in the Province, and that the worms are hardy and liable to withstand greater vicissitudes in weather conditions, a rearing of these worms offers exceptional facilities over a greater part of the Mysore State than in the case of mulberry worms.

Some attempts made.

Attempts at rearing Eri silk worms have been made at Hassan, Chickmagalur, Harihar, Melkote and at one or two other places. The cocoons yield good silk, but the rearers are not aware of the names of firms who would buy the cocoons and this information was supplied to them.

It is worth the while of a silk expert to inspect these localities and advise the people concerned regarding the details of rearing the Eri cocoons and of spinning the fibre.

Summary of Suggestions.

Future work—Educational and industrial

The suggestions offered above towards the improvement and expansion of sericulture in the State embrace work under two distinct heads :—Industrial and Educational. It is not possible, at present, for any effective work on these lines being done either by the people directly engaged in the work, as they are poor and wanting in information, or by the capitalists, who always fight shy of entering into new fields of activity. Under these circumstances, Government will have to step in and take the initiative under both the heads of this industry, of such immense importance to the State and with such bright prospects before it.

Government initiative necessary

Points in favour of such initiative.

The *laissez faire* policy appears to be indefensible in this case and it may be pointed out in support that the Bengal Government have increased their annual grant to the Bengal Silk Committee, from Rs. 6,000 to Rs. 15,000 from June 1907, for stimulating the industry by promoting the rearing of healthy worms and expanding mulberry plantation. (Industrial Conference Report, Calcutta.)

According to Booth Tucker's Report published in 1910-11, the Cashmere Government were spending from 5 to 6 thousand pounds sterling annually, *i.e.*, Rs. 75,000 to Rs. 90,000 in the purchase of seeds alone. According to Watts Commercial Products of India, Madras Government spent Rs. 3 lakhs in 4 years and Rs. 78,736 subsequently for constructing filatures at Vellavedu, although the expenditure did not produce the desired result.

Work done by France and Italy.

Even in foreign countries, encouragement in sericulture has been extended as in France and Italy. There are 40 Normal Schools in the department of Midi in France for young men and women, where scholars are taught to select seeds by microscope for 2 months, after which they rear silk worms for seed. No other technical subjects are taught in these schools.

France has in addition been levying protective tariffs to encourage local silk industry.

One decided advantage in favour of this Government encouragement to the industry lies in the fact that the interest of English merchants and those of Indians are common. Once the industry is established on up-to-date lines by the pioneering work of Government, English merchants would soon capitalise the Indian industry and work it profitably alike to themselves and to the local men engaged in it. If it be conceded that Government help and initiative would be necessary, a special Government staff will have to be organised to give effect to the various suggestions made above in the two main directions :—Industrial and Educational,

and the work will have to be continued for at least 5 years, before any beneficial and permanent results could be achieved.

Work done since the organisation of the Economic Conference.

Since the organisation of the Economic Conference, considerable amount of work has been done in some of the various directions indicated above and an extract* is given below detailing such work :—

The mulberry cultivation in the Mysore district has been declining for the past two years, and owing to persistent disease among the silk-worms in the T.-Narsipur taluk, the ryots, have taken to cultivating *cholam* in preference to mulberry. The Economic Conference have taken up the subject of improving silk industry in the State. There were eight instructors teaching sericulture as part of nature study to 66 pupils during the year under report. One of these instructors who is the Head Master of the Government Kannada School at Mysore, did particularly noticeable service in the cause of sericulture by giving theoretical and practical lessons on the life-history of mulberry and eri-worms, on the methods of cultivating mulberry and castor plants, rearing silk worms, and reeling silk and preserving cocoons, and also on the diseases of silk worms. He was placed in charge of eri-silk stall at the last Dasara Exhibition where his exhibits were highly appreciated and were awarded a certificate of honourable mention. At Malvalli, four crops of eri-silk yarn were raised by the local instructor and seeds were supplied to the surrounding villages with instruction on the method of rearing eri-silk worms. At the Tata Silk Farm at Bangalore, managed by the Salvation Army towards which an annual grant of Rs. 3,000 has been sanctioned by Government, the subjects of sericultural study and instruction have been grouped as follows :—

(*a*) *Mulberry Department*, dealing with the details of the planting and cultivation of mulberry ;

(*b*) *Worm-rearing department*, beginning with the carding of eggs and ending with the packing of cocoons ;

(*c*) *Reeling department*, dealing with steaming and drying cocoons up to packing silk by means of the press ; and

(*d*) *Weaving department*, beginning with bleaching raw silk and ending with the dressing of the finished silks after weaving.

Of the number of persons who received instruction on the Farm during the year, 26 consisting of teachers, students, and ryots belonged to the State, 21 were boarding students from Travancore, two from Madras and the Telugu country, and two were English officers who have gone to open a silk farm in the Punjab. About 2,000 persons visited the Farm during the year, and 20,000 mulberry cuttings as well as 979,750 eri and mulberry eggs, selected and examined by the microscope, were sent out. Samples of Mysore silk from the Farm were sent for being exhibited at the Silk Exhibition recently held in London, and, in the words of the President of the Exhibition, "attracted the attention of many of the visitors to the exhibition including the King and Queen and others of the Royal Family ;" and the President is of opinion that there is a possibility of an increasing demand for the Mysore silk in European markets and that if the silk be sent to Italy or France in the raw state and thrown by French or Italian throwsters, it would prove quite a good class of serviceable silk.

Weaving in Silk in Bangalore. †

The bulk of the Bangalore weaving trade is in silk.

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* Mysore Administration Report for 1911-12.

† Compiled from the notes of inspection taken by the Weaving Assistant.

Solid bordered *sadis* with *kanas* are prepared to the greatest extent by these silk looms, while silk kerchiefs keep a few engaged. **Types of cloth woven.**

Much of the silk used in Bangalore comes from Chikballapur, Nandi and other neighbouring places, that from Channapatna not being in such demand as it is considered weaker.

Silk from the experimental Farm, Bangalore, is nearly equal in quality to the Bengal silk and sells at Rs. 9 per seer of 26 tolas. The price is rather prohibitive for its general use.

The loom used is the simple and primitive type of pit-loom. **Weaving implements.**

The reed (ಕಟ್ಟು) made of (ತೆಳ್ಳಿಕೋಲು) sticks costs Re. 1-8-0 each.

The shuttle (ಉಳ್ಳ) costs Re. 1-8-0 each, extra shuttles up to 3 in number are needed for solid bordered cloths.

The (ಗುಂಟೆ) or cloth roller is a wooden roller to wind the cloth on, and costs Rs. 2-8-0 each.

The (ಹರಿಗೆ) or slay is generaily made of (ಬಿದಿರು) wood and costs from Rs. 8 to Rs. 20.

(ಸೇಡುಕೋಲುಗಳು) consists of a pair of bamboo sticks with pins at the ends and is used to keep the cloth stretched.

Healds (ಅಚ್ಚು) are made of twine and are knitted, forming loops in the middle through which the warp-ends are drawn. These last for 8 or 10 *sadis* and cost about a rupee per set.

Backrest consists of a piece of bamboo to hold the warp at a certain height. This with the brackets costs about 8 annas.

These together with a few more make the cost of a country loom from about Rs. 18 to 30.

The raw silk to be strong and durable has to be twisted. It is first wound on bobbins at a cost of about annas 8 per lb. and the thread is then twisted at another half a rupee per lb. **Treatment of silk previous to warping.**

The coating of gum on raw silk prevents the fibre from taking any dye. Hence it is degummed, the clean fibre left having lost 25 per cent of its original weight.

The yarn is then dyed to the colour and shade required and the dyeing charges amount to Re. 1-12-0 per lb. for scarlet red and from 6 annas to one rupee for other colours.

The thread is then warped by stretching on a warping frame.

The silk is lastly spread out and gum is applied to it. Some weavers use a brush and some do not. This does not make much difference in the weaving.

The *raw* silk required for a *sadi* weighing 2 lbs. will be about $2\frac{2}{3}$ lbs. The charges paid for the various operations are. :—

	Rs.	a.	p.
Reeling	1	5	4
Twisting	1	5	4
Dying at Re. 1-4-0 per lb.	3	5	6
Warping, gumming and winding on pins	2	0	0
Total ...	8	0	2

The weaver is paid from Rs. 13 to 15 for weaving a pair of solid bordered *sadis*, takes about 22 days to one month and earns from annas 7 to 8 per day. **Weaving charges.**

The least price of a *sadi* of the above description is about Rs. 40 each, and the cost of the raw material amounts to Rs. 16, the making charges to about Rs. 14-8-0 making up a total of Rs. 30-8-0 per *sadi*. Thus the capitalist makes a profit of about Rs. 10 on each *sadi* and if he dyes his own yarn, he earns about a rupee more per *sadi*. **Sowcar's earnings.**

CHAPTER IV.

WOOL.

Wool. Wool is the third most import textile raw material produced in the State. It is collected by shearing from the body of sheep and also from the backs, legs and face.

Sheep are maintained for this purpose in all parts of the State, except in the *malnad* or forest tracts of the districts of Shimoga, Kadur and Hassan. The wool clipped from sheep grazing on soft and fertile lands is reported to be softer, longer in staple and greater in quantity than that from those roaming over rocky and sterile tracts. North western parts of the Harihar Sub-taluk are noted for the best wool in the Mysore Province.

Some localities of supply. Almost the whole of the Chitaldrug district and parts of the taluks of Pavagada, Sira and Chiknayakanhalli in the Tumkur districts, together with Hole-Narsipur and Arsikere in the Hassan district form the chief areas of production of wool.

Wool is clipped twice in the year, once in the cold season, known as *Mage Oonne*, and the other before the rainy season, known as *Kare Oonne*.

The wool clipped from a flock of 50 sheep is termed a *solagey* and the quantity in a *solagey* varies with the locality and ranges from 1 to 2 maunds (of 24 lbs.) per crop of 6 months. One man clips one *solagey* in one day and is paid annas 8. Since the Bangalore Woollen Mills were started, the prices for wool have increased considerably, from an average of Rs. 2 or 3 to Rs. 4 or 5 per maund of 24 lbs.

Methods of buying wool. There are 2 methods of getting wool from *Gollars* or owners of flocks. The weavers advance them money at about Rs. 25 per flock of 50 on the understanding that they should get all the wool and when the *Gollars* refuse to supply, then the money advanced has to be returned. Cash is paid for wool supplied and no interest is charged on the advance.

According to another method, the *Gollars* are given one good *kambli* of about 8 × 3 cubits and another smaller one called *gongty*, the total value of the 2 amounting to about Rs. 5, in return for one *solagey*, every six months. Also the *Gollars* get the wool clipped and sell it at market rates.

Some *Gollars* also spin the wool and sell the thread at about 4 annas per seer, of 24 tolas.

A defect in the local supply of wool. One main defect in the local wool supply is that it is composed of a mixture of the inferior varieties from the face, legs and backs and of the superior from sides. The *Gollars* do not take the pains to separate the superior from the inferior and consequently they do not realise as much price as they could do otherwise. Whereas, if they could adopt the means in vogue elsewhere of clipping or shearing intact, so as to keep the form of the body of the animal, the better sort of wool can be readily separated from the less valuable and the total wool supply made to fetch a better price.

Wet wool from tanneries. Inferior wool is also available in the form of wet wool shorn from sheep skins and supplied from the several bark-tanneries at Vaniambadi, Ambur and other parts of Madras and also from Kodigenhalli, Nagavara, Jeevanhalli, Chikballapur and Channapatna, in Mysore. This wool is sold at rates varying from Rs. 20 to 30 per *Bharam* of 20 standard maunds of 24 lbs. each and a large quantity is

imported to Sira and to Chiknayakanhalli. About 5,000 maunds are consumed every year at the latter place alone.

Quantity of production—An estimate.

The shearings from the 2·7 millions of sheep in the State constitute the local source of supply. At the rate of ten ounces of raw wool from each sheep per shearing, the two shearings in the course of the year, one at every six months, would give nearly 3·4 millions of pounds.

Trade.

Figures of external railborne trade show that 7,538 Bengal maunds were imported during the year 1910-11 and 1,143 Bengal maunds exported, leaving a balance of 6,395 maunds or about 5¼ lakhs of pounds in favour of Mysore.

Consumption.

The total consumption of wool in the State during the year 1910-11 may thus be taken to be 39·45 lakhs of pounds.

Mills and hand looms.

The consumers of this wool are the woollen mills at Bangalore and the 6,100 handlooms for wool in the State. The Binny mills could consume about 200,000 pounds a month, *i.e.*, 24 lakhs or 2·4 millions of pounds every year. But during 1910-11, they consumed 868,259 lbs. and the balance of 30·57 lakhs of pounds should have been consumed by the 6,100 handlooms, which means a little less than about 500 lbs. of wool per loom per year. Thus the consumption by the woollen mills is between ⅓ and ¼ of the quantity used up by handlooms.

The import is mostly of wet wool from the tanneries in Southern India. This is of low grade and inferior. As stated already, it is used mainly by the wool weavers of Chiknayakanhalli and Sira who prepare cheaper kinds of *kamblies* for use in the *malnad*.

Weaving in wool is carried on in the State in (1) mills, and (2) in handlooms.

There is one mill in Bangalore spinning wool and also weaving blankets.

The Bangalore woollen mills.

The woollen department of the Binny Mills was started in 1887 and has been working ever since. The mills have specialised in preparing army blankets. There are 47 looms, 22 of which are now working and 792 spindles with 396 in working order. Raw wool is obtained mostly from the Mysore State, *viz.*, Davangere, Kolar and to a small extent from Adoni, Madras, Calcutta and even from Tibet. During the year 1912, the outturn from the Mills was 868,259 lbs. as Blankets and Jhools, valued at Rs. 379,869 while that sold was 983,359 lbs. for Rs. 523,089.

The woollen mills are not working with their fullest capacity and their maximum consumption could reach to 2 lakhs of lbs. per month or nearly two and a half millions of lbs. per year.

Waste products from the Bangalore woollen mills.

N.B.—A considerable quantity of potash and oil is being washed out every day and much of it is accumulating in the tank belonging to the mills. On an average, 2 cwts. of potash, ½ cwt. of cotton oil soap and about 3 cwts. of oil are used up every day, in the process of washing the woollen blankets. 75,000 gallons of this washed water are being daily discharged with about 160 lbs. of waste wool in it, along with the other substances mentioned above. Half the waste wool is recovered and sold. The total quantity of wool washed is about 4,000 lbs. every day.

Some of these waste products along with silt have accumulated over an area of about 500′ × 100′ in the mill tank and to a depth of about 3′ on an average. This was going on for the last 20 years. There is a sewer drainage into this tank almost close to this deposit. If this silt could be utilised as manure, hundreds of tons could be had and I would suggest that the material be analysed and tested and if found suitable, the ryots might be encouraged to remove as much as they could possibly do when the water in the tank goes down in summer.

The dyeing department of the mill also yields waste products from the dyeing vats and they are now being run into tank as wate. The quantity and the manurial value of this waste product might also form a point for investigation, with a view to use it as manure.

Hand-looms for weaving in wool.

There are about 6,100 handlooms in the Province for weaving in wool and preparing cheap *kamblies* or blankets for use in the *malnad* and costlier *kamblies* for use elsewhere, besides *dhavlis* for export to Tiruvannamale, in the South Arcot district. These last are worn by Brahmins after bath, before *puja* and when they offer their prayers to God. A thicker type, termed *ujjukambli*, is also prepared for use as cheap warm carpets. Fifteen wool weaving centres were visited in all and information gathered.

Malnad kambli, as the cheap warm blanket usually worn by the people of the *malnad* is called, is usually 6′ × 3′, weighs about 2 lbs., and costs from 8 annas up to 1 rupee. This is prepared very largely in the taluks of Sira, Chellakere, Pavagada and Maddagiri and also to a smaller extent at Tarikere. About 180 kamblies are turned out of one loom per year requiring about 15 maunds (360 lbs.) of wool or 12 *kamblies* per maund. At several places *ujjukamblies* or rubbed blankets, besides various other patterns are prepared for use by ryots in the *maidan* parts.

Carding wool.

The wool is first cleared of its knots by hand and its impurities by a bow-string, after which process, the fibres are fit for spinning.

Spinning wool.

Wool is spun by power in the Bangalore Woollen Mills and by hand by women in the mofussil. Women of the weaver families do the work. Locally made spinning wheel is used, the left hand and foot being engaged in the actual spinning process and the right hand in turning the wheel.

The quantity spun per day varies from 1 to ¼ lb. according to the fineness of the yarn required and the wages are reckoned at 1 to 2 annas per day respectively. At Hunsur and Chiknayakanhalli, where *ujjukamblies* are prepared, 1 lb. of wool is spun per day. At Yemmehatti and Davangere where superior kamblies worth Rs. 30 and more are prepared, the rate of spinning is only 6 tolas per day. At Satnur near Mandya where *dhavlis* are woven on a large scale and at other places where *kamblies* worth Rs. 5 to Rs. 12 each are prepared, one woman spins 12 tolas or ½ a pound per day.

Every weaver in wool requires the help of 3 women on an average to spin the yarn and to do the other preparatory processes, and the rate of weaving decreases with the fineness and quality of fabrics woven and almost at the rate of spinning.

Size and weight of *kamblis*.

The size of the various woollen fabrics prepared locally varies also with the quality, from 6′ × 3′ or 2 square yards in the case of the cheaper variety required for consumption in the *malnad* to 10 × 3½ cubits or even 4 cubits or 8¾ to 10 square yards with variations in weight and value. The weight of a *malnad kambli* as well as that of *dhavlis* prepared at Satnur is about 2 lbs. The *ujjukamblies* manufactured at Hunsur and Chiknayakanhalli weigh from 5 to 6 lbs. each, while the *kamblies* of Davangere, Yemmehatti and other places range in weight from 2½ to 6 lbs. on an average, according to fineness and dimensions.

Wool consumed and outturn per loom.

The maximum monthly outturn per loom and the quantity of wool consumed vary from 4 maunds or nearly 100 lbs. in the case of *ujjukamblies* to 2 maunds in the case of those required for the *malnad kambli* and only half a maund in the case of the finer ones of Davangere and other places.

Ujjukambli

What is termed *ujjukambli* is a woollen blanket woven with the thickest wool-yarn spun by women. It is of a very loose texture and sizing of tamarind seeds is used during weaving.

It is woven in three parts called *patties*, each part being of the same length as the final one and all the 3 being stitched together. It is then soaked in water and rubbed for some hours by 2 women and 2 men on a narrow platform of coarse cocoanut ropes mounted on the tops of wooden supports, stuck into the ground.

This rubbing, when wet, brings about the closeness of the loose texture and also compactness, so much so, that the final length is $5\frac{1}{2}' \times 4'$ from the original $9' \times 5\frac{1}{2}'$, before rubbing.

The weight of each of these *kamblies* varies from 5 to 6 lbs. and is sometimes 8. On an average, 15 such are prepared in a month, the quantity of wool consumed being about 90 lbs. Two women are necessary to spin the yarn required by one weaver and to produce 15 blankets per month. **Outturn and value.**

The value of these blankets varies from $2\frac{1}{4}$ to $2\frac{3}{4}$ Rs. according as it is bought before or after being subjected to the rubbing process.

Ujjukamblies were being prepared on a larger scale at Hunsur, Chiknayakanhalli and other places when wool was cheaper than at present.

Dhavlies or thinner *kamblies* of finer wool, with or without fine silk borders are woven mostly at Satnur, Undahalli and other villages of the Mandya taluk. These are worn by the religiously inclined Brahmins and others after bath, during *puja* and during visits to temples. They are in very great demand in Tiruvannamale, in the South Arcot district and most of the production from Mandya is sold at that place during *Karthige* festival. **Dhavalis.**

The *dhavali* is woven in two parts and then stiched by hand and measures $3 \times 1\frac{1}{2}$ yards. The average weight of a *dhavli* is 2 lbs. and its value Rs. 1-8-0 and more according to the quality. **Weight and value.**

The wool required for this work is all gray and bought at Rs. 7 per maund (the quantity of clippings from one *solage* of 50 sheep for 6 months gives only half a maund of this wool). The wool is spun by the weaver women at half a seer or 12 tolas per day and 3 such women would be required to keep one weaver at work and consuming about 24 lbs. of yarn per month for weaving 12 *dhavlies*.

The wages of women are reckoned at Re. 0-1-4 per day so that the spinning charges would amount to Rs. 7-8-0 for the 3 women necessary to keep one loom going. The 12 *dhavlies* bring the weaver about Rs. 18 on an average, out of which Rs. 7 will have to be deducted as the cost of wool, leaving a balance of about Rs. 11 to be divided between one male weaver and 3 female spinners working for the whole month. It will not pay the weaver to engage outside female labour to spin the wool for him, for he will have to pay Rs. 7 towards their wages and to be content with earning Rs. 4 per month.

At the rate of 24 lbs. per loom per month, the annual consumption by the 200 and odd looms at Mandya engaged in this work would amount to over 4,800 maunds, of a total value of Rs. 33,600.

In these looms they prepare also *madi sanchis* or small bags of woven wool, for keeping the sacred clothing to be worn after bathing and these are sold at $4\frac{1}{2}$ annas each and 56 of these are woven in a loom in a month. The quantity of wool consumed and the quality of yarn required are the same, as for weaving *dhavlies* and the weaver prepares either the one or the other from the same loom, according to demand. **Madi sanchis.**

The weavers of Satnur obtain their supply twice a year from *Gollars* owning sheep and no wet wool from tanneries is used. These weavers would be very much benefited if they could buy their supply of wool at the most favourable rates by advancing money to the *Gollars* before the cropping season. This is the method adopted by the brokers, supplying wool either to Binny Mills or to Cawnpore Woollen Mills.

Yemmehatti, Devangere and Chitaldrug kamblis.

Kamblies of about 6 lbs. in weight and valued from Re. 1-8-0 to Rs. 3-0-0 each, are also prepared by a few of the looms in these places, and the quantity of production is comparatively small. About 10 kamblies are woven per month and $2\frac{1}{2}$ maunds or 60 lbs. of wool are consumed by one loom. The yarn required is coarse and the rate of spinning is fast.

The fine wool blankets prepared at Yemmehatti, Hampanur, Davangere and other places in the Chitaldrug district include the finest piece of work in weaving in wool in the State. These blankets vary in dimensions from 8×3 cubits or $12' \times 4\frac{1}{2}'$ *i.e.*, $4 \times 1\frac{1}{2}$ sq. yard to $10 \times 2\frac{1}{2}$ cubits or $5 \times 1\frac{1}{4}$ yards or about 6 to $7\frac{1}{4}$ square yards each. They fetch Rs. 6 to 12, on an average, and Rs. 30 and even more in the case of finer varieties.

Three to four women are required to spin the yarn consumed by one weaver. In the case of blankets worth about Rs. 6 or so, the rate of spinning is not more than half a pound per woman per day, whereas in the case of superior sorts only 6 tolas. The rate of weaving also is different. Only 3 blankets are woven by one weaver in a month, each of which fetches about Rs. 6 and consumes about 6 lbs. Finer sorts require only 4 seers of wool per kambli and a man is not able to prepare one in 15 or 20 days. The demand for these superior kinds of *kamblies* prepared at Davangere and other places is comparatively small.

Malnad kamblis.

The *kamblis* which are prepared on a very large scale at Sira, Pavgada, Maddagiri and Challakere require very coarse yarn, $1\frac{1}{4}$ lb. or even 2 lbs. being spun by one woman in one day. Though the men are capable of weaving about one a day, their average annual outturn is reported not to exceed 180 or 15 per month per loom.

There are 376 looms for wool in Challakere, 243 in Hiriyur, about 270 in Maddagiri, nearly 430 at Sira and 265 at Pavgada, almost all these being engaged in preparing this type of blanket.

From 30 to 40 lbs. of wool per month or up to a maximum of about 500 lbs. per year, are consumed by every one of these looms. Even supposing that 1,000 out of these 1,580 looms are engaged in preparing these articles, the quantity of wool required would amount to about 5 lakhs of lbs. the least or about 20,000 local maunds of 24 lbs., each.

It appears that the wet wool of tanneries is being consumed here, the supply being received from the tanneries in Bangalore and other places.

Malnad kambli is lose in texture and is woven of thick yarn. Loseness of texture, and thickness of yarn, facilitate the dripping down of all rain water and therefore prevent the thread from going out. For these reasons, the loseness of texture is considered essential in these cheap blankets.

(At Sira 43 lbs.=72 seers=1 maund.)

Economic Condition of the Weavers in Wool.

At Sira, Challakere and other places the Sowcars advance money to the weavers free of interest, on the understanding that the money is to be paid back in about 9 months in the form of *kamblis* to be sold exclusively to them, at one anna less than the market value of each *kambli*. For want of capital, the weaver loses Rs. 1 on every Rs. 10 and it means 10 per cent per month or 120 per cent per year.

The economic condition of the weavers in wool in Chiknayakanhalli is really deplorable. About 4 maunds of wool per month per loom are consumed there, one half of which is wet wool, scraped from the wet skins of the sheep of tanneries

and imported from Vaniyambadi, Ambur and other parts of Madras, while the other half of the supply is obtained from local sources, as from the Hassan district. The weaver, as usual, depends on the local sowcars and for both his supply of wool for the disposal of his goods. The sowcar buys a maund of wool of 28 lbs. at Dudda and other parts of the Hassan and Arsikere taluks, for Rs. 5-12-0 and sells a local maund of 25 lbs. at Rs. 6-8-0 per maund, thus gaining nearly Rs. 2-12-0 on every 2 maunds of local wool sold. The 2 maunds of wet wool required per month is bought by the sowcar at Re. 1-8-0 per maund at Ambur, Gudiyattam and other places and the transit charges amount to annas 8. So a local maund of this wool actually costs Rs. 2 to be delivered at Chiknayakanhalli. The sowcar sells the wet wool, however, at Rs. 3. (Rs. 3-8-0 sometime before.) The weaver thus loses at least Rs. 2 on the 2 maunds of wet wool he consumes every month, or a total of Rs. 4-12-0 for all the 4 maunds.

His troubles have not ceased here. On an average, one weaver weaves 12 *kamblis* per month, the prices of each of which is reckoned at Rs. 2-2-0. He sells it to the sowcar at Re. 1-14-0 each, thus losing 4 annas on each *kambli* or about Rs. 3 in all per month.

The total loss is thus Rs. 7-12-0 per month, and this could hardly be believed, had it not been for the fact, that these figures were obtained direct from the wool weaving population of Chiknayakanhalli, both when they had assembled in numbers at the Travellers' Bungalow and at their own looms, during my visit thereto.

If it be remembered that the small balance left for him every month is to be taken as the earnings of one weaver and of at least 2 women for spinning, the position of the weaving industry in wool is really worthy of strong support.

The weavers assured me that if they could go in person to Dudda and other places and advance money to the *Gollars* and shear the wool themselves with the help of a few coolies, they could purchase wool at about Rs. 4 per maund. They require some capital for this. Owners of about 100 looms are in debt to the extent of about Rs. 25 and the owners of the other half have no debts but own houses and have, besides, some landed property and they could be advanced money for the purchase of wool, both locally and at Vaniyambadi or other places. The present practice of obtaining wool at Dudda and other local sources is that the *Kurubar* brokers advance money to the extent of Rs. 25 without interest on every 50 sheep, with the assurance that the clippings from those should be supplied to them exclusively, for which the *Gollar* receives cash payment.

Some Bangalore merchants are collecting wool from the Hassan district and sending it away to Bombay and Cawnpore.

Unlike the weaver in cotton or in cotton and silk, the *kambli* weaver has to depend upon the steady work of at least 2 women for supplying him with yarn and his earnings which are less than that of his brother weaver in cotton, have to be shared between him and 2 women and his share dwindles practically to nothing. But he is forced to keep up the work, mainly because he knows no other work, by which he could earn a living and has very often no lands besides. When land is available easily, the wool weaver gives up his profession and takes to agriculture. This has happened at Hunsur where most of the weavers in wool, attracted to the place when Hunsur was preparing *kamblis* on a large scale for the Military, have settled down as agriculturists now.

There is another reason why the weaver in wool sticks to his calling.

Like his brother weaver in cotton and others, he is thoroughly conservative as regards migration to other parts, and is content to eke out a living in the place of his fore-fathers.

Fly shuttle loom for weaving in Wool.

One enterprising weaver at Davangere has adapted the pit loom to weaving in wool with fly shuttle attachment. He was away from Davangere at the time of my visit thereto, and I was not able to obtain any information on this new enterprise.

It appears that one man set up a similar loom at Malebennur and that the whole of his family died and the *kurubars*, who are superstitious to a degree, consider such an innovtion as inauspicious and likely to end in similar annihilation of their families.

Experiments with fly shuttle loom attachment to the pit loom for weaving in wool would be very desirable. The weavers raise three objections to such an introduction. They consider that compactness of texture of woollen blankets is brought about :—

(1) By the continuous sizing during weaving by 3 or 4 hard blows with a heavy piece of wood called *bevu* to keep each pick in place. Each of these blows means time and is necessary.

(2) They doubt if an introduction of fly shuttle slay would really end in any advantage. Two processes have to be done at each pick, *viz.*, sizing as well as weaving hard.

(3) The continuous long warps which would be necessitated by an introduction of fly shuttle arrangements will give a number of blankets and each has to be cut from the others and this cutting is considered inauspicious and against their established tradition and also harmful to the blanket, since the end threads get lose when *kamblies* are shaken violently, as after rains and any knots introduced to prevent the ends getting lose would prevent a free dripping down of rain water along the warp, a texture which is highly desirable in a *kambli* intended for the *malnad* rains.

Summary of Suggestions under weaving in Wool.

It appears to me that attempts at improving this industry should be directed into the following ways :—

Difficulties in the way of introducing fly shuttle slay for weaving in wool.

(1) By providing cheap accommodation of capital to buy wool at the most favourable seasons of the year on Co-operative principle making the sowcars as partners in the business as suggested under cotton and silk weaving and Satnur and Chikanayakanhalli might be tried.

(2) By introducing twill weaving, as in the case of some imported rugs and blankets, which would effectually prevent the yarn from getting lose and it would not interfere with the free flow of water along the warp, and besides, the yarn required need not be fine and therefore could be spun, as at present.

(3) By experimenting on weaving in wool with fly shuttle attachment to the pit loom.

(3) By introducing the dyeing of wool and with it, pattern weaving, as in the twill woven blankets imported from Western Countries; since coloured woollen yarn is sold only in wholesale quantities and at prices that would not leave much margin of profit to the wool weaver.

(5) Another point that might be thought of to expand the industry would be to improve the breed of the sheep, so as to obtain wool of a better quality and of longer staple, fitted for finer fabrics and in the introduction of a better method of clipping wool in such a way that the clippings would be entire so as to enable the better kind of wool being separated from the inferior kinds.

(6) The introduction of a simple devise like the Scotch Spinning Wheel, exhibited at the Mysore Exhibition of 1912.

(7) Dyeing of wool and utilisation of the suint from wool for manurial purposes.

(8) And lastly—the introduction of a cheap method of preparing simple felted articles in wool by improving on the present method of preparing *ujjukamblies.*

Weaving of woollen Carpets in Bangalore.*

The carpets of Bangalore were once well known for their durable quality and were characterised by bold designs and by clearly defined and deep toned colours' As such, they were highly prized in foreign markets.

Sir George Birdwood, in his work on Oriental Carpets, says :—

" Notwithstanding, however, the sweet charm of the Abbasi Persian carpets of modern trade, the palm for pre-eminent artistic merit, above that of all other denominations of oriental carpets now manufactured for merely commercial gain, must be awarded to those of Masulipatam and Bangalore ; to the former for their perfect adaptability to European domestic uses and to the latter on account of the marvellously balanced arrangement of their colossal proportions and the titanic power of their colouring which, in these carpets, satisfy the feeling for breadth and space and impressiveness in State furniture, as if they were indeed made for the palaces of Kings and the temples of the Gods ; and these Southern Indian carpets, the Masulipatam derived from the Abbasi Persian and the Bangalore without a trace of the Saracenic or any other modern influences, are both relatively to their special applications, the noblest designed of any denominations of carpets now made, while the Bangalore carpets are unapproachable by the commercial carpets of any time and place."

This important industry of preparing pile carpets began to decline since the appearance of plague in 1898 and it is practically extinct now, the few that were engaged in the superior work having been forced to take to weaving the cheaper and inferior druggets.

There are about 200 weavers and spinners in wool in Bangalore, who work as coolies under about 23 carpet makers, the average earnings of the weavers varying from 4 to 6 annas per day.

Increase in the price of wool, due mainly perhaps to the local demand from the Bangalore Woollen Mills and decrease in demand in foreign markets brought about by the decline in the quality and colouring of the carpets also appear to have contributed to the observed fall in the industry.

Till recently, wool was being dyed by vegetable dyes and the foreign market appears to have appreciated them, now, the cheaper aniline dyes have replaced the vegetable colours and the demand fell.

The processes of washing and cleaning wool have also been dispensed with

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* Compiled from the notes of inspection taken by the Weaving Assistant.

CHAPTER V.

MISCELLANEOUS WEAVING.

Tinsel

Tinsel of silver white and golden yellow colour is woven into tapes in the Bangalore City. It appears that Madras is the only other place in the whole of India, where tinsel is woven into tape, and that Bangalore is better situated than Madras, since weathering effects are less, whereby the tinsel loses its luster and shews copper colour.

It is woven into tapes of breadths varying from 9 to 40 threads of the tinsel, *kora* silk and mercerised cotton being used for the weft. Most of the production in Bangalore is of 20 threads. Each tape woven is termed a '*than*'—35 yards in length.

The weaving of tinsel is worked both by power and by manual labour.

Power worked tinsel looms.

There is only one factory in Bangalore weaving tinsel with the aid of electric power. It was started about 2 years ago and has been working since. There are 10 looms worked by 5 small motors of about 0·34 H.P. each, one motor working 2 of the looms. There are 15 shuttles in each loom weaving 15 tapes. Ten men are employed at 6 annas each per day and three boys at 3 annas each. The factory works for about 27 days in the month.

Out-turn.

The out-turn of tinsel tape of 20 threads in breadth is 2 *thans* of 35 yards per shuttle per day. Three-fourths of the total quantity of production is of this breadth and the other one-fourth being mostly of 40 threads. The total quantity produced from the 5 looms now working is about 3,000 thans of 20 threads per month and 500 of 40's breadth. The first is valued at 2 annas 9 pies per *than* and the other at Rs. 0-12-0 to 0-4-3 and the total value of the monthly outturn reaches to about Rs. 715 or to about Rs. 8,500 per year.

Working expenses.

Seven boxes of tinsel of 2,200 bobbins each are consumed and of a value of about Rs. 6,000. The factory is situated in a rented building and pays Rs. 132 per year and Rs. 150 more towards the cost of power consumed, besides Rs. 1,300 for wages.

Hand-looms for tinsel lace.

There are about 167 more tinsel looms in the City, worked by hand. The weavers work for wages, the raw materials being supplied by sowcars who also sell the tapes. The daily outturn in these hand looms is reported to be 22½ *thans* per loom, being 75 per cent of that from the corresponding power looms.

Tinsel is reported to be sold by only one firm in Bombay who are the sole Agents in India and they get their supplies from France.

Silk threads, etc., at Sindghatta.

At Sindghatta, Krishnarajpet taluk, there is a small industry of weaving silk threads (*Udidara*) waist bands (*Nadukattu*) as well as silk twists for borders of *panches*, *kamblies*, and for ornamental work on the Military Uniform and for *namdas* over State horses, elephants, etc.

The silk used for all this work is either what is spun by hand by women from the silk waste, or kora silk or even china silk. These are sorted into various grades of fineness, dyed and woven or worked as above.

The silk twist used for *punches* was being largely supplied to the weavers in Melkote, Hosaholalu and other places. But for the last three years, the Melkote weavers have taken to the use of Japan silk and they no longer depend on Sindaghatta who have consequently lost their chief vocation, and have gone down in their material condition.

The weaving and other work at Sindaghatta are all done by Musalmans. There are about 150 houses, of whom about 25 families are mere wage-earners. The silk spun by hand by Mussalmans-women from silk-waste is all bought from Kunigal, Mambhasahalli, Haradanhalli, Maddur, Closepet, Chennapatna and Undaghatta, at Re. 1 to Re. 1-4-0 per seer. The women of these places buy silk-waste at annas 8 per seer and spin a seer in four days.

Cotton Tape and Rope.*

This is the smallest textile industry in Bangalore. About 20 families of Mahomadans near the Municipal Gardens in the City are engaged in tape and rope making. There are also a few in the Malvalli taluk.

Tape is largely sold in the market and is used for cots, tents, horses' girth, etc. The Military Stores of the Mysore Government consume a large quantity annually—grey tape is mostly imported from Madras and the *Khaki* tape from England. Locally about 300 lbs. of 2" and 2½" tape is made every month, and a weaver weaving about 25 to 30 yards a day of 10 hours earns about 6 annas a day.

The yarn is prepared by twisting 2 or 3 strands of 4's yarn and this operation costs 7 annas per 10 lbs. of yarn. A man takes about half a day to prepare 100 yards of warp and is paid wages of 3 to 3½ annas.

Thus the cost of preparing 200 yards of tape amounts to about Rs. 2. with proper appliances this cost can be reduced to nearly half.

A handloom of Messrs. Hattersley & Sons weaving 3 tapes simultaneously could produce about 200 yards of tape a day. This loom costs about Rs. 250 and it will enable the weaver to considerably increase his earnings besides securing the market, at present taken up by the outsiders.

An efficient doubling machine for twisting the threads may be found of great help to those engaged in this industry, as well as to the carpet manufacturers, and such a machine could be locally made at a cost of about Rs. 60.

Red narrow tape.

Red narrow tape is used in the various Government departments and is generally imported from England. This tape can be woven on the *nakki* machines, so largely used in the City for tinsel lace, with a few alterations.

A new industry may be started if the Government were to buy the tape locally. Such a machine can be had for Rs. 30 or hired for demonstration work.

Weaving of Mats.

Kadakola and other places.

Kadakola is the most important place in the State where mats are woven on a large scale. There are 95 looms here engaged in this work, 35 looms at Sollapur, 43 at Aiyarhalli and about 10 at Keralu, making up a total of about 180 looms in the region. Mats are also woven to some extent in Sira taluk and in the village of Amarti near Melkote and in others.

Materials used. Production. value.

At Kadakola, they use a reed called *cheni* and the twine required is prepared from *kattale* or *agave* fibre. The mats woven are usually coarse, valued from 8 to

* Compiled from notes taken by the Weaving Assistant.

10 annas each. They prepare about 15 per month or about 180 per year, thus bringing the annual total production in this area to about 32,400 mats, and valued at about Rs. 16,000 in all.

Experimental work at H.-Narsipur.

Some experimental work in this line is also being done in the Industrial School at Hole-Narsipur with the object of introducing improved methods in this manufacture and also variety in design. The Superintendent is also experimenting on the preparation of window *chiks*, after the pattern of those imported from Japan and other countries.

The mat weaving industry is highly developed in parts of Tanjore, Tinnevelly and Palghat, where very fine work is turned out.

A suggestion.

I would suggest that a good workman be brought in from any of those places, and taken to Kadakola and other areas. He may then be stationed at Kadakola for at least 6 months to train a number of local men to prepare mats, of a finer texture and of better finish than at present. Weaving of mats with ornamental and complicated designs may also be introduced.

Supply of reeds in other places.

The reeds required occur abundantly in different parts of the State and large supply is available round about Nanjangud itself.

All along the bed of the Vedavati River below the Marikanave dam, and along that below the Borankanave Reservoir, enormous quantities of various kinds of reeds are available. These and other regions might be inspected and detailed information collected.

If some of the nomadi 'tribes' *korachars*, etc., be induced to settle down below these two reservoirs and taught the industry in its improved form, a double object would have been attained. The settlers will become cultivators of land and also utilise their spare time to weaving of mats.

Date mats

The numerous coffee planters of the Hassan and Kadur districts consume several lakhs of date or other mats every year. Enquiries made at Saklespur, Chikmagalur and at a few coffee plantations have revealed the existence of a very large demand for such mats, as well as for baskets.

Extent of demand.

The coffee plantations at Saklespur and round about require 2 mats per acre per year at 3 annas per mat and they estimate that not less than a lakh of such mats of the aggregate value of about Rs. 20,000 in round figures would be required in that region alone. Chikmagalur planters also consume 2 mats per acre at 2 annas each and they want about 1½ lakhs of mats, of a value of Rs. 30,000 more; or Rs. 50,000 worth for coffee alone.

Assuming that 2 date mats can be woven by one man in a day, about 350 men will be required to supply this quantity, provided all of them are workers throughout the year or nearly double that number if they work for only 6 months or during their leisure hours.

There is room, here, therefore for utilising more men to get articles of better finish prepared. Chikmagalur and Saklespur would be two of the most suitable places where this industry can be organised and a small school might be started at each of these places to train boys to prepare not merely these mats for a local supply but also baskets.

N.B.—A very large number of baskets is also consumed by the coffee planters. At 3 baskets per acre, valued at annas 4 for the three, more than 1½ lakhs of baskets are consumed by the coffee planters of the Hassan district alone, of a total value of Rs. 15,000 at the least, and one and half times that number by those of Chikmagalur, making up a total of Rs. 37,500 in value and 3¾ lakhs in number. The raw materials used are *watte*, *bamboo* and *cane*, all of which occur in great abundance in the *malnad*.

What is required is initiative, organisation and training of the men.

Suggestion.

I would therefore recommend that two industrial schools for weaving mats and baskets be started, one at Saklespur and another at Chikmagalur, besides one at Kadakola.

Steps might also be taken to colonise *korachers* and others near Marikanave and Borankanave.

General.

Earnings of a weaver and some other artisans.

The average wages of the carpenter do not fall below 8 annas per day, a skilled workman getting as much as Re. 1. The blacksmith earns a similar amount. The gold smith gets much more, the least being about a rupee per day earned legitimately.

With all his special skill and training, the weaver is not able to earn at least as much as his brethren who have not learnt more.

Measures for improvement to aim at a finality.

He is a victim to circumstances and he is too feeble to improve his condition. The factors which operate against attempts at improving his condition, he is unable to overcome or modify. Any death blow to the calling which might be dealt with sooner or later may not happen for about a generation at the most and it is a sufficiently long period justifying measures being devised on his behalf.

Such measures must have some *finality* about them, so as not merely to relieve them temporarily from their present condition of low wages and high indebtedness, but should aim at providing a small capital to help them to enter into other fields, when the present calling no longer pays. If these ideals be kept in view and measures devised, the time, energy and money spent in this direction will have been very well spent indeed and any idea of the likely extinction of the handloom weaving industry need not deter Government or others from adopting measures to save them. And if the finality be kept in view, such measures will become absolutely imperative.

Some beginnings of a probable decline.

The contingency may happen some time hence, and is already beginning to show itself. The Swadeshi Mills of Bombay and those at Ahmedabad and several others are putting into the local market fabrics which are steadily replacing *panches* woven by handlooms. One Sholapur Mill is also producing cheap cotton bordered *chireys*, which are finding their way into every nook and corner in the State. Already the handloom weaver in *chireys* is unable to compete in this direction.

Mill made cotton bordered *cheereys.*

These *chireys* from Indian Mills are wider, nicer in texture and also cheaper and it is no wonder that the ryot population are going in for this sort of fabric, although the local weaver in cotton bordered *chireys*, now being displaced, is trying to spread his opinion against the Mill made fabrics, stating that they would not be so durable or their colour would not be fast.

The Mill owners in Bombay would be extending their business in this line. Some of the local Sowcars and others will, in course of time, also find no field for employing their money at usurous rates of interest, as at present, and they will be forced to seek fresh fields and pastures new for investment.

Then some Mills might be started in Mysore as well. This is one direction from which the blow to the handloom weaver is likely to be struck. If this field be invaded by power looms, the fate of handloom weavers as a whole will be sealed. I am not so sure of this field being invaded by the products of Cotton Mills in England and other places, and if this happens, the blow will be much more severe and perhaps extinction of the handloom weaving in cotton will be brought about much sooner.

Precautionary measures desirable and perhaps necessary

Consequently, attempts should be made at devising precautionary measures, so as to make the weavers not feel the blow suddenly.

The exact form which this precautionary measure should take is not quite clear to me now and all that I wish to suggest is that *in case of any such contingency*, which, in my opinion, is likely to happen at no distant date, it is desirable that ideas are being developed as to the best ways and means by which such a large population will not be turned out of employment.

The adoption of improved cottage looms capable of producing larger outturn and which should be set up as co-operative concerns may replace these individual handlooms. Development of the co-operative principle might, after a time, become possible.

CHAPTER VI.

DYEING.

Out of the textile raw materials, *viz.*, cotton, silk and wool, cotton yarn is dyed mostly blue in several parts of the Province, and turkey red on as maller scale. Dyeing of silk is carried on extensively, almost every weaver in silk dyeing his silk himself. Dyeing of wool is carried on, on a small scale, by weavers of the Bangalore City.

Cotton yarn is dyed on an extensive scale, in Bangalore City, at Dommasandra in the Anekal taluk and at Anekal, besides at Tavarekere near Mandya, at Dodballapur and at Kodur near Magadi.

The Bangalore Woollen and Cotton Mills have a dyeing establishment and there are two other but smaller dyeing concerns in the City, *viz.*, the Lakshmi Dye Works, and the Mavalli Dyeing Works.

Dommasandra.

Blue black dyeing of cotton yarn, as carried on at Dommasandra, is an old indigenous industry. There are four large dyeing establishments in that village, three of them owned by Mussalmans and the fourth by a Hindu, with 1,000 vats between them. There are, besides, about 500 vats owned by several individuals, thus making a total of 1,500 vats. The dyeing, as is done here, is considered very fast and the yarn is in very great demand for all the black *cheeres*, turned out of the various looms in the Province.

Raw materials, quantities and values.

20's and 30's are most used and are obtained from either the Binny or Maharaja Mills. On an average, 2 bales of yarn or 800 lbs. are dyed per day. The indigo needed is imported from Proddattur in the Kadapah district, to the extent of about 60 maunds per month or 720 maunds per year, at prices varying from Rs. 45 to Rs. 60 per maund of 42½ seers, of 24 tolas each.

Neeli. Soda.

Every maund of *neeli* requires 1½ maunds of soda, if brought from Guntur or 3 maunds from Mandya, costing about 9 annas and Re. 1-2-0 for the 1½ or 3 maunds respectively, and 1,080 maunds of soda are consumed at Dommasandra every year, valued at Rs. 400.

Gum.

Gum is required and used at 1 maund per maund of indigo and it costs Rs. 6 per maund, or a total of 720 maunds valued at Rs. 4,320.

Lime.

Another raw material required for this industry is chunam, at 60 measuring seers for every maund of *neeli* used; and it is supplied at Re. 1 per 50 seers or Rs. 4 per candy of 200 seers. About Rs. 900 worth of chunam is required every year.

A seed.

They also require a seed called '*Chakche beeja*' at 25 measuring seers for every maund of *neeli* or 90 candies of 200 seers each for the year. It is bought at Rs. 18 per candy, at a total cost of Rs. 1,620 for the year.

Yarn dyed and value.

Two maunds of *neeli* are required every day for 2 bales of yarn or one maund per bale. Roughly speaking every vat requires from 1½ to 2 tolas of *neeli* per day, with an outturn of ½ lb. or 20 tolas of dyed yarn. The cost of materials used daily works to about Rs. 128 and value of the annual consumption to Rs. 50,320 exclusive of yarn for which a further sum of Rs. 1,45,000 has to be spent every year, or Rs. 1,95,320 in all.

The sale value of the yarn dyed is estimated at Rs. 2,16,000, leaving a balance of Rs. 25,000 for 1,500 vats or roughly Re. 1-2-8 per vat per month.

Persons engaged and wages

Sixty-two coolies are actually engaged in the four establishments, with about 30 more in the smaller ones or roughly about 100 people for the 1,500 vats or 1 for every 15. They are paid at monthly rates, varying from Rs. 5 to 9 per cooly. The charges for dyeing vary according to the number of immersions and strength of solution of these vats and range from Rs. 2 to Rs. 12 per bundle of 10 lbs. Two and a half rupees per bundle is what is paid by most people. About 75 per cent of the yarn dyed at Dommasandra is dyed at this rate, about 20 per cent at Rs. 3 and the other 5 per cent from Rs. 8 to Rs. 12. The best dyeing that the place is capable of is reported to fetch Rs. 60, per bundle of 10 lbs.

Process of charging the vats.

Lumps of indigo are crushed in half maund lots at a cost of 4½ annas. Forty vats are charged with 2½ seers, in all and in the clear water obtained from an admixture of chunam and soda in proper proportions and the whole stirred again with the special seeds well boiled. This charge is kept over night the lime and soda water added for 5 days. After 7 days, the ingredients will present a shine, when yarn is dipped into it. Strength of colour increases with the number of immersions in vats containing concentrated solution, the yarn dipped in the 11th, 12th and 14th vats of concentrated solutions being considered the best.

What is known as the *four seer banna* yarn can be obtained by immersing it in the first 7 pots only and is charged at Re. 1 per bundle of 10 lbs. When it is dipped in the 8th, it is charged at Re. 1-8-0, in the 9th at Rs. 1-12-0 and in 11th Rs. 2-8-0 and so on. The least number of dips for the yarn is 28, at 4 dips in each of the first 7 pots, for a period of half a minute each.

It appears that the water of wells of the Dommasandra village is suited for the dyeing process.

The process of dyeing as practised at Anekal is very similar. There are about 640 vats in all, in Anekal, requiring about 25 maunds of *neeli* per month or about 300 per year, with proportionate quantities of other materials.

Twenty maunds of gum at Rs. 6 per maund per month or 240 maunds at Rs. 1,440 per year are required at Anekal.

A sum of abont 2½ lakhs of rupees is spent annually between Dommasandra and Anekal in the purchase of raw materials including cotton yarn.

Suggestions.

Both the Sowcars of Anekal and the dyers of Dommasandra pay Rs. 5 extra for every maund of indigo got from Prodattore in Cudappa, as they buy in retail for want of funds to buy the articles at whole-sale rates at Prodattore itself.

The indigo is sold in 2 maund boxes and the transit charges amount to Rs. 1-4-0 per box or 10 annas per maund.

It appears that the material loses weight by time and the value of the loss on this account is estimated at 10 annas per maund.

For a maund worth Rs. 45 at Prodattore, the local merchants and dyers pay Rs. 50 or Rs. 5 more, from which have to be deducted the expenses amounting to Re. 1-4-0 or they incur a nett loss of Rs. 3-12-0 per maund.

The merchants could be advanced money for 2 months and they could be made to save much of this loss.

As it is, the material has to pass through three middle men before it reaches, Dommasandra or Anekal. The value of the material is thus enhanced by Rs. 5 per maund and Rs. 3-12-0 of which could be saved to the industry, if a wholesale purchase could be organised and then the total saving under the head between Dommasandra and Anekal will be not less than about Rs. 4,000 a year. Again if

the total quantity of the gum required is brought by one merchant and distributed, a considerable saving could be effected to the benefit of all the dyeing population.

Dyeing at Tavarekere.

There is a small dyeing establishment at Tavarekere about 1½ mile to the east of Mandya. It was started about 10 years ago by a small capitalist who has engaged 3 men from Madras at rates varying from Rs. 10 to Rs. 12 per month and 15 local men are in addition employed at Rs. 5 to Rs. 6 per month. There are 40 vats working at indigo dyeing with 20 more now closed. Yarn is also dyed of other colours.

20's, 24's and 30's are dyed blue. According to the owner, the yarn from Binny Mills is less twisted and better suited for dyeing than that from the Maharaja Mills. Consequently the price of the Binny Mills yarn is high and varies according to counts. About 20 bales per month is sold at Mandya, excluding the locally dyed yarn and nearly 2 lakhs of lbs., of coloured yarn is consumed at Mandya and its surroundings every year.

Trade in dyestuffs.

The import of alizarine dyes has nearly trebled itself during the 15 years ended 1910-11 and the price has fallen to nearly a third. The import of indigo likewise just doubled itself during the period, indicating a greater activity of the dyeing of cotton yarn but the quantity appears to be a little too low since the two places Anekal and Dommasandra consume, between themselves, a quantity equal to the total import, while there are besides other dyeing factories which use indigo. The increasing import of turmeric indicates also a greater activity in the dyeing line.

I do not see why cultivation of turmeric should not be extended to meet the increasing local demand.

Manufacture of cutch desirable.

Trade in cutch has been contracting both inwards and outwards. The two kinds of trees from which cutch is extracted, *viz.*, *Accacia cutechu* or *Kagli* and *Mugli* or *Accacia suma*, both occur in the Mysore State. And the process of manufacture is simple, there appears to be no reason why people should not be induced to manufacture it on a small scale to meet at least the local demands.

Uses of cutch.

It is used locally for dyeing, tanning and for medicine. It acts as a preservative in the case of fishing nets dyed with it. Canvas acquires a brown colour by this dyeing agent. As a tanning material it is not satisfactory, as the leather is apt to give yellow stain. Its use in medicine is more as an astringent.

Process of manufacture.

The heart wood of *Accaci catechu* or *Kagli* is cut into small chips, boiled in water in earthen pots till the water is reduced to about one half. The liquid is transferred to an iron vessel, boiled again and stirred to the consistency of a syrup. It is then poured into wooden frames lined with leaves, and allowed to cool when it hardens into brick-like masses. The weight of yield of cutch varies from 3 to 10 per cent of the weight of wood used.

Popli chakke (*Ventioga Madraspatana*). This due stuff is the thin inner lining of a bark of the above name and is available in large quantities from the forests of Hunsur, Bidadi, Closepet, Kankanhalli, Heggaddevankote and Kadur, etc. Coolies collect and sell it to contractors. About 200 maunds were thus collected at Hunsur during the last year valued at Rs. 800. It is sent mostly to Salem where it is sold at Rs. 6 per maund. It is not usually available in large quantities owing to the difficulty in the malnad of getting the coolies to gather the bark.

Dyeing of Cotton and Silk in Bangalore.*

Synthetic colours steadily gain in popularity on account of their cheapness and handiness, driving the indigenous dye-stuffs almost entirely out of the market. The only colours which still maintain the unequal struggle are *indigo, cochineal and kapila powder.* Even Indigo is being supplanted by artificial Indigotin, as in Dodballapur for example and other places, as they are cheaper and far easier to manipulate.

Madder and cochineal are replaced by various alizarine and aniline dyes. These synthetic dye-stuffs give purer shades and are equal to the vegetable products in every respect.

Dyers in Bangalore

There are about 12 families of weavers in Bangalore who dye silk for their own use as well as for others and about 10 who dye cotton yarn besides dealing in it.

Vegetable dyes used

Indigo (ಕಡುಬು) is largely used for blue and blue black shades. Though the process is tedious and costly, the colour is highly priced by the public for its fastness. This dye is obtained from the indigo plant chiefly grown in Bengal and Behar. Synthetic indigo (artificial) is of the same composition and being much cheaper is slowly taking the place of natural indigo.

Cochineal (ಕಿರಿಮಂಜಿ) kirimanji, a corruption of the word crimson, is the name given by the dyers here to cochineal, which they still mistake to be a seed or grain. This is the product of Mexico and Gautemala obtained from the female *cochineal* insect. *Kapila powder* ಕಪ್ಪಲಪುಡಿ is of a reddish colour; when rubbed between the fingers it leaves a stain of golden tint. It is not soluble in water. Therefore it has first to be mixed with oil into a sort of paste and then diluted in water containing lime and an alkali. The dye is obtained from Rottlera Tinctoria a large tree found in many parts of Mysore. The powder falls from the capsules and is said to be collected on beds of chunam, lightly strewn under the tree.

Mordants used.

Mordants used; *Fuller's earth*, ಜಾಳು, is the alkaline earth used by all dhobies. With dyers it is an indispensible article being used by them not only as scouring material for silk previous to dyeing but also as a mordant.

Alum ಮುಟ್ಟಿಕಾರ.—This is largely used in dyeing of silk red and yellow.

Chunam ಸುಣ್ಣ.—It is sparingly used and is obtained from Channapatna.

Seeds of Tagarai Plant.—The dry seeds are of greenish brown colour. When boiled they swell and form into a glutinous mass which is added to the indigo bath.

Silk dyeing.

The chief colours dyed are, red, yellow, green, grey, blue, rose and black. Of these only red is fast to light, perspiration, and washing. Green is fugitive to light. Grey and blue are loose. Black is obtained from indigo and is generally fast.

Scarlet red is dyed from *cochineal* and yellow from ಕಪ್ಪಲಪುಡಿ a vegetable product. Other colours are obtained from basic dyes sold in the bazaar.

Cost of dyeing silk.

Dyeing of scarlet red from *cochineal* dye costs as much as Rs. 1-4-0 per lb. of raw silk, since the price of the dyestuff has nearly doubled now. This amount also includes the cost of degumming the yarn.

For 1 lb. of raw silk the following are required.

RED.

		Rs.	a.	p.
Cleaning—				
12 tolas of Fuller's earth and 6 tolas of lime	....	0	0	6
Dyeing—				
6 tolas of Alum	....	0	0	6
½ lb. of cochineal dye and ¼ lb. of ಪಸಾ	....	1	2	3
Total	....	1	3	3

* Compiled from notes taken by the Weaving Assistant.

YELLOW.

12 tolas of శర్పలేకట్టు	0	4	0
6 tolas of Fuller's earth and 3 tolas of Alum	0	0	6
Total	0	4	6

GREEN.

Cleaning—			
12 tolas Fuller's earth and 6 tolas lime	0	0	6
Dyeing—			
6 tolas of Fuller's earth and 3 tolas Alum	0	0	6
5 tolas of Kapila powder శర్పలేకట్టు	0	1	9
¾ tola of royal green at 7½ annas per 10 tolas	0	0	6
Total	0	3	3

Process of dyeing silk.

Scouring.—The silk is obtained in the market in the *kora* or unbleached condition and it requires to be cleaned of the resinous coating of the silk fibre, as it prevents the latter from taking up the dye easily. 12 tolas of Fullers earth and 6 tolas of lime per lb. of silk are dissolved in water and the clear liquid is drawn off and heated. The silk is worked in this boiling liquid for 2 or 3 minutes till all the gum is dissolved. It is not allowed to stand for a longer period as the alkali is likely to dissolve the silk fibre.

Red.—The silk so cleaned is first prepared by soaking it for 3 days in alum solution (6 tolas per lb. of silk). Kirimanji is ground dry with half its weight of *Pista* into a fine paste with a little water. The mass is dissolved in a sufficient quantity of water and heated to boiling. The alumed silk is then worked for about ¾ hour. While this is going on the quantity of powdered dye and ground *pista* as stated above is taken and mixed with smaller quantity of water than was first used. The silk is taken out and washed well. The fresh decoction of cochineal is added to the boiling solution and the silk is boiled again for an hour. Lastly the silk is washed in clean water.

The reason for using the quantities of the dye twice is to ensure evenness of colour on the stuff. The vats employed are either of stone or wood; in the presence of iron or copper the shades are duller.

Deep yellow or orange.—The dye is prepared by mixing 12 tolas of *Kapila* powder with a little gingelly oil and 3 tolas of alum into a thick paste. This is afterwards dissolved in a solution previously prepared of 6 tolas of Fuller's earth boiled in the required quantity of water. A beautiful orange coloured liquor is thus obtained into which the prepared silk is steeped and kept soaking for a few hours if a deep yellow is required and for a whole night if a deep orange is desired.

Blue.—Is obtained from Basic dye of the B. A. S. F. Co.

Green.—The silk is first dyed yellow with only 5 tolas of Kapila powder. A solution of ¾ tola of green dye (Basic dye of B. A. S. F. Co.,) is made and is added to the boiling water containing silk in small quantities so that the colour may coat the yarn more evenly.

Black.—Dyed in a solution of iron and myrabolams.

Dyeing cotton

Turked red dyeing

Almost the whole quantity of Turkey red yarn used in the Province is imported from outside, as the process involved in a difficult and elaborate one. Attempts made by some of the capitalists to introduce this industry have all met with failures in most cases for want of technical skill.

This industry is in such a flourishing condition in Madura, that a number of factories have been recently started there, and are dyeing the yarn not only for local use but also for export. The local demand here is enormous as will be seen from the imports of dyed yarn and if this new industry be introduced in the State, many will find a lucrative business and bring wealth to the country. With this object in view a small model dyeing factory may be started to introduce this "Laki" process of dyeing.

Indigo blue.

Indigo is the only blue colouring substance known here and it is used chiefly for dyeing blue black. The vat is charged with ground indigo, boiled seeds of Tagaria Plant, dhobies earth and chunam. The liquid is allowed to ferment for about a week when the bath will be ready for dyeing. A little more of lime is added and the yarn is worked in the liquid cold. The number of operations is multiplied according to the strength required. Several baths are prepared varying in strength and also as regards the ingrediants added to each as mordants and the stuff is exposed to each one in turn being dried after each immersion. Dyeing of loose cotton colours is carried on to some extent. But yarn of fast colours is all imported either from Bombay or Europe.

Import of dyed yarn in Bangalore City.

Every month about 50 bales (of 400 lbs. each) of Turkey red yarn and 30 bales of other colours are imported and sold by the local yarn merchants. Following are the market rates of dyed yarn when 40's grey yarn sells at Rs. 3-10-0 per five lbs.

	Price per five lb. bundle.	Grey yarn.	Cost of dyeing.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
40's Turkey red	5 12 0	3 10 0	2 2 0
40's orange	4 6 0	,,	0 12 0
40's lemon	4 6 0	,,	0 12 0
40's yellow	4 10 0	,,	1 0 0
40's pea green	4 6 0	,,	0 12 0
40's dark green	4 10 0	,,	1 0 0

Thus annually a sum of over one lakh of rupees goes out in the shape of dyeing charges for the yarn used in Bangalore City alone.

An opening for small Dye Works.

By E. R. Watson, Esq., M.A., B.Sc., F.C.S., Member of the Society of Dyers and Colourists, Professor, Dacca College, Dacca.

"Mr. J. G. Gumming, in his "Review of the Industrial Position and Prospects in Bengal in 1908" says it is calculated that there is a profit of 2 annas per lb. in the dyeing of yarn, and an increase of 4 annas per yard (of cloth) after Turkey-red dyeing.

"For the plain dyeing of yarn and piece goods, a start at any rate could be made in quite a small factory consisting of a simple godown for dyeing house, an engine house, a dyeing-shed and a compound. The plant would consist of a vertical boiler of some 6 H. P. capacity, some half a dozen rectangular wooden boiling and dyeing vats, $6' \times 4' \times 6' \times 9' \times 2\frac{1}{2}' \times 2'$ and so on, fitted with steam pipes for heating, a steaming cylinder about 5 feet long and $3\frac{1}{2}$ feet diameter, two or three dyeing jiggers for dyeing cloth up to 42 inches width, a sizing and mangling

machine and drying cylinder for cloth of the same width, a small engine for driving the cloth-treating machinery and a small pump for filling vats, etc., Rs. 50,000 should suffice for setting up such a small factory.

"With this plant and some 30 operatives we might dye daily about 250 lbs. of yarn and 150 lbs. of cloth with some simple direct dye, or 200 lbs. of Turkey-red yarn. For *simple direct dyeing* we should require very little in the way ofchemicals, say, some 5 per cent soda-ash for scouring and 3 per cent dye stuff and 10 per cent glauber's salts for the dye-vats.

The following is a rough calculation of yearly expenditure and income :—

EXPENDITURE.

Chemicals.		Rs.
Two tons, soda-ash at Rs. 11-8-0 per cwt		460
Twenty-four cwts. dye stuff at Rs. 120-0-0 per cwt		2,880
Four tons, glauber's salt at Rs. 10-0-0 per cwt		800
Fuel		900
Labour		4,800
Interest on Rs. 50,000 loan at 10 per cent		5,000
	Total ...	14,840

INCOME.

Gross profit on 250×300 lbs. yarn at Re. 0-1-6 per lb.	7,030
Gross profit on 150×300 lbs. cloth at Re. 0-6-0 per lb.	16,875
Total ...	23,905
Annual profit for management	9,065

"For Turkey-red dyeing, the chemicals required form a considerably greater item. The following calculation has been based on the directions issued by the Badische Aniline Soda-fabric for dyeing Turkey-red with alizarine, and the cost has been calculated from the monthly price list of drugs, dated October 21st, 1908, in the new number of the *Journal of the Society of Dyers and Colourists*. The prices in India, would of course, be somewhat different, but the lower rates for oil would practically counterbalance the higher rates for imported chemicals.

EXPENDITURE.

Chemicals		Rs.
Soda ash, 26 cwts at £4-5-0 per ton		83
Castor oil, 75 cwts at £24 per ton		1,350
Sulphate of alumina, 122 cwts at £5-5-0 per ton		480
Carbonate of soda, 24 cwts at £7-10-0 per ton		135
Alizarine 20 per cent, 5,400 lbs. at 0-7-0 per lb.		2,362
Soap, 21 cwts at 25 per cwt		394
Chalk, 37 cwt at per ton		44
Olive oil, 6½ cwts at £50 per ton		244
Fuel		900
Labour		4,800
Interest on Rs. 50,000 loan at 10 per cent		5,000
	Total ...	15,792

INCOME.

Gross profit on 200×300 lbs. yarn at Re. 0-7-6 per lb.	28,125
Annual profit for management	12,333

These calculations show that there should be sufficient profit in such a small factory to allow the Manager Proprietor to pay 10 per cent interest on a loan of Rs. 50,000 and make a comfortable living for himself. It would probably pay best in such a small factory not to attempt too many classes of work."

Bleaching by Electrolysis.*

"Another use of electricity, and one which is making rapid strides on the Continent, is that of Electrolytic Bleaching, first adopted on a large scale by a firm in Russian Poland, some twenty years ago. For this purpose, electricity is used in the manufacture of bleaching liquor from salt water, producing sodium hypochlorite, which is neither acid nor alkaline in character. The Electrolysers have been in continuous use up to-day.

There are many objections to using the bleaching agent hitherto in use, *viz.*, chloride of lime.

In the process of bleaching the lime present is deposited on the fibres, hindering effective penetration; the outside of the thread is well bleached, but the action is prematurely stopped by the lime, and the supply of the additional chlorine needed is checked, so that there is a liability to irregular bleaching.

With the electrolytic bleach, the liquor employed being only salt water, or rather hypochlorous acid in a weak solution of soda, no deposit of an insoluble nature can take place.

Probably one of the greatest advantages attending the use of electrolytic bleach is in the regularity of strength. The salt and water are mixed by measure, and the resultant brine tested by hydrometer. It is then run into the Electrolyser and the electricity switched on.

For *raw cotton bleaching*, the electrolytic bleach is unrivalled. Cotton bleached with cloride of lime is notoriously difficult to spin on account of its harshness-due to the action of the lime, which is seen during the spinning deposited on the roller beam as a very find dust, whereas bleached by electrolysis it spins as well as grey cotton and it is much easier rinsed, with less loss of fibre. For *curtain bleaching* the electrolytic bleach has marked advantages, more than half-a-dozen curtain manufactures on the continent have been employing the electrolytic bleach for three years past. It is in use also in several *Swiss works for bleaching embroidery*. Five firms of lint and medicated gauze manufacturers are using electrolytic bleach for upwards of six years past.

The largest firm of *jute manufacturers* on the continent are using electrolytic bleaching for four years past.

The apparent cost of the electric bleach is not appreciably in excess of that of bleaching powder, and it does fully 15 per cent more work, and in the case of, for instance, linens, three chemickings with electrolytic bleach do the the same work as four with chloride of lime. There are also other compensating advantages and economies, less acids and wash water, etc, which combine to render the electric bleach the cheaper as well as the more desirable in actual use.

In Germany, where the system has been for some years before the public, the last two years have seen a very rapid increase in its popularity, and particularly since public bleachers adopted it, and published the fact that they used electric bleaching.

Electrolytic bleach is also employed by several *papermakers abroad*, and at least two noted firms are using it for bleaching sulphite pulp. which commands top

* The Indian Textile Journal, December 1911.

price on the market; it has been found that, strength for strength, it does its work in half the time used cold; paper bleached with electrolytic sodium hypochlorite, having no lime in its composition, does not yellow so readily by age, and is not so brittle; it also felts better.

For *laundry work* the electrolytic bleach is making great strides to the advantage of the public. It reduces the work of the rotary washer by one-half, thus diminishing the baneful grinding and pounding, and brings up the linen as white as when new. The Americans were quick to appreciate its advantages. In the two years that the apparatus have been built there, 150 laundries have adopted it. It is in use also in the laundries of the whole of the Geman Passenger Steam Service, the Nord Deutsche Lloyd having led the way, and now the Cunard S. S. Co., have introduced it into their laundry.

For *hospital work*, sterilising infected clothing, it is used quarter strength, and for washing floors, passages, and for drains it is used from half to full strength. It destroys bacteria and the germs of pthisis, yellow fever, cholera, typhus, and anthrax, and unlike chloride of lime and the various disinfecting powders, it does not choke up the drain. It is also nonpoisonous.

The use of electrolytic sodium hypochlorite has also been advocated by the most eminent English and Continental authorities for *sterilising suspected* drinking water, one part in one million being sufficient, and being but salt water is absolutely harmless. It is already being used in swmming baths for preventing the unplesant odour frequently perceptible.

Not the least of its advantages is, that it may be allowed to run into rivers without injury, as whatever free chroline there may be present is rapidly oxidised by light and air and the organic matter present.

The last application of electrolytic sodiun hypochlorite is to the treatment of woollen *hosiery* due to the discovery by German chemists that a weak solution renders these unshrinkable.

Since the passing of the New Patent Act, this Electrolyser has been built in England, and the makers, Messrs Ernest Grether & Co., of Manchester, will be glad to supply further details upon applications.

CHAPTER VII.

TANNING.

The old rural industry of curing hides has been very largely replaced by organised bark tanning on a large scale. Chrome tanning has also been introduced by the Mysore Tannery, Limited.

Chrome Tanning.

The Mysore Tannery, Limited, was started in Bangalore nearly four years ago, as a Joint Stock Company with a capital of a lakh of rupees raised in shares, mostly from the Mysore State. It is being worked on modern lines by a highly trained Master of Arts in Chemistry, who received his practical course under Mr. Chatterton, in experimental chrome-tanning work undertaken by the Madras Government. The articles turned out of this Tannery were pronounced almost as good as those from Europe or America. The Company could not meet the demands for boots and shoes, inasmuch as there was no local labour trained and fit to execute the orders efficiently and they had recourse to the only other alternative of getting the work done by outside labour at Madras. As it was found too costly to get as many as 200 such men from Madras, the Company decided to send the tanned leather to that place to get it prepared into articles.

With a view to expand the business, the Government of His Highness the Maharaja of Mysore were pleased, at the special request of the Company, to subscribe shares to the value of Rs. 60,000 and there is a very near prospect of the Company being able to meet the very large demand there is for boots and other articles.

Besides the one in Madras, this is the only other factory in the whole of Southern India, where hides and skins are tanned by the process of chrome-tanning.

Raw materials consumed

About 12,000 hides of an average weight of 30 lbs. each, and 24,000 skins constituted the raw material for the year 1911-12. The supply of hides is both local and from Madras, a good number being obtained from the Nilgiris. The skin supplied is all local. The finished leather is in demand all over India, outside Mysore.

Other materials used are:—60 *bharams* of 680 lbs. per *bharam*, of *thangadi* bark (cassia-auriculata) per year, of a value of Rs. 2,500; 3 tons of bichromate of potash, Rs. 2,000; 6 tons of soda; 12 tons of chrome alum, Rs. 3,000; 12,000 pounds of castor oil and about 200 local maunds of jinjili oil; besides about Rs. 250 worth of shell lime.

The various drums and other leather finishing machinery are worked by suction gas plant of 28 B. H. P. Fuel used is charcoal. Sixty four bags of 60 lbs. each at 10½ to 12 annas per bag are consumed every month.

Waste products.

The several waste products of tannery and values are:—fleshings worth Rs. 600 per year, wool and hair valued at Rs. 600, 18,000 lbs. of offals and splits at Rs. 6,000 and 15,000 gallons of washings from the tannery containing about 200 lbs. of animal matter.

Whether this large liquid waste could be utilised for manurial purposes is a point which appears to deserve investigation. Could the oil with soda and lime

be separated by some process and utilised for manufacturing washing soda is also a point which might be given a little thought by experts.

Bark Tanning.

This industry is carried on in four places in the Province, *viz.*, in the vicinity of Bangalore, at Channapatna, Chikballapur and Kadur.

One *lubbay* merchant is seriously thinking of establishing another bark tannery at Chintamani, as that place happens to be very well situated for the supply of hides and bark, besides for water suitable for tanning.

Bark tanneries near Bangalore

There are about 33 tanneries in the vicinity of Bangalore, two of them situated in two *kayamgutta jodi* villages and one in Government village, all within a radius of about a mile and immediately to the north of the slaughter house near St. John's Hill, Bangalore Cantonment. Originally they were situated within the municipal limits of the Station and they were required to remove to their present places on sanitary grounds.

These tanneries have been in existence for the last 60 years or more. Several of them were established in recent years, owing to the fact that the water of the place was found to be peculiarly favourable for bark tanning.

Scale of work.

Kadagandanahalli is one of the villages, while Jeevanahalli and Nagavaram are the two others. Twentyfour of these tanneries are on a large scale, while the other nine turn out a smaller quantity of tanning work. From 20 to 30 thousands hides are tanned annually in each of the big factories and about 5 to 6 thousand from each of the small ones. Fifty to sixty men work in each of the big factories and from 10 to 15 in the smaller.

Those in the mofussil.

One of the two tanneries at Channapatna is reported to be 60 years old, engages about 72 men while the other was started about two years ago and with an output of only 50% of that of the other.

The one at Chikballapur was started 14 years ago and may be classed among the larger tanneries.

Process of tanning.

The process of tanning is the same in all these places. The salted hide is immersed in chunam water for 6 or 8 days, after which the hair is removed; it is again immersed in a fresh solution for about 4 days, after which the fleshings are scraped off. The hide is then immersed in water charged with the bark of *thangadi* (Acacia Auriculata) and the proces repeated thrice. Three days of further immersion in bark water and gallnut completes the tanning process, by which time the tanning extracts would have permeated completely throughout the thickness of the hide. It is then scraped, washed and oiled with *hongey* oil (Pongamia Glabra). Rubbing with oil and fat is the next process after which it is dried, and, when half wet, American flour is spread and a plank run on with some more fat and oil. One day's final drying finishes the whole process after which the leather is packed ready for transit.

Materials consumed

Six different materials are required for the bark-tanning-process, *viz.*, *thangadi* bark or (Acacia-Auriculata), chunam, gallnut, oil, fat and lastly flour. On an average, 22½ lbs. of bark are required for every 10 lbs. of the tanned hide or about 25 lbs. of the raw. One and a half measuring seers of chunam are consumed in the processes of unhairing the above quantity of hide, 3¼ lbs. of gallnut, about $\frac{5}{8}$th lbs. of oil, ½ a pound of fat and about $\frac{5}{16}$th lbs. of flour.

On an average, 8½ lakhs of tanned hides of 10 lbs. each are estimated to be tanned annually at the 37 bark tanneries in the State, or roughly 1 lakh of Bengal

maunds by weight. The quantities,of the various materials consumed are given below :—

Quantity of hides	Quantity of raw materials used per hide	Quantity required for 8,50,000 hides in lbs.
No. 8,50,000 ...	Tanning bark 22½ lbs. ...	19,125,000
	Gallnut ¾ lb. ...	637,500
	Oil ⅝th lb. ...	531,250
	Fat ½ lb. ...	425,000
	Chunam 1½ measures ...	1,275,000 measures.
	Flour $\frac{5}{16}$ lb. ...	265,625

The raw hides are bought at 3½ to 4 lb. per rupee and at this rate the value of the raw material alone amounts to the very large sum of 53 to 60 lakhs of rupees which with the total value of about Rs. 12,65,000 for the bark and other articles amounts to Rs. 65,65,000 to Rs. 72,65,000 for the raw material alone.

About 1,500 men are engaged in this industry, earning wages varying from 7½ to 12 rupees per month or at an average of 10 rupees. The aggregate annual expenditure totals up to not less than a lakh and fifty thousand rupees on wages alone. How much of this is earned by the Mysore people is a point for detailed enquiry.

Waste products.

There are three distinct kinds of waste products accumulating during the tanning process and before packing the tanned hide for export, *viz.*, the hair scraped from the outer or skin side of the hide, to the extent of about a pound in weight from every hide tanned ; fleshings from 1 to 1½ lbs. as scraped from the flesh side of the hide and, lastly, the small pieces of dressed hide clipped off, after dressing and before packing, to the extent of about ¼ lb. per hide.*

It is well known that the fleshings from tanneries are utilised in the manufacture of glue, about 2 pounds of the former yielding one of the latter. Glue costs about Rs. 7-8-0 per maund. The very large quantity of about 12,75,000 lbs. of fleshings available from the bark tanneries in the State could be more profitably converted into glue locally than by exporting to places outside the State, perhaps to return thereto in some manufactured form. The climatic conditions of Bangalore appear to be in favour.

But it should be borne in that attempts were made in Madras over 10 years ago, to start the manufacture of glue in the way suggested above. The fleshings were bought at rates varying from Rs. 15 to 20 per candy of 500 lbs. and subjected to the process of soaking in water, washing, liming, deliming and boiling more or less successfully. The final drying process appears to have given them trouble, thus stopping the promoters from proceeding any further with the venture.

It appears also that the people who pioneered the venture lost about Rs. 7,000 in the attempt. A second trial by another met with the same fate.

The 2,12,500 lbs. of clipping from hides now being sold at about 1 to 1½ annas per pound may perhaps be utilised along with hoofs of cattle and sheep in the manufacture of potasium ferrocyanide, which sells at about 1*s* 2*d*, per pound.

Method of collecting hides and skins.

The work of collecting hides and skins from the various parts of the State is almost entirely in the hands of *Lubbeys* or Tamil speaking Mussalmans from Vaniambadi, Vellore and other places outside the State, excepting at a few places, like Sira and Chiknayakanhalli and others, where the local Mussalmans replace

*

Quantity of hides	Waste product per hide	Total waste products.
8,50,000 in number ...	Hair 1 lb. ...	... 8,50,000
	Fleshing 1½ lb. ...	... 12,75,000
	Bits ¼ lb. ...	... 2,12,500

them. None but Mussalmans carry on this trade; and the only local men who participate in the business are a few *Kulavadies, Thoties* and *Thalayaris* and all of them belong to the lower classes.

Cooly lubbey.

The *Lubbey* works both as a whole-sale merchant and as a retail buyer and seller. At every taluk, town and almost every important village, the *Lubbey* has established store-houses for hides and skins, known as *Mandies*. Every *Mandy* or store-house employs a number of cooly *Lubbeys* who wander about the country and collect these goods by buying them from the *Kulavadies, Thoties* or *Thalayaris* as the village servants are called. Every cooly *Lubbey* is usually a paid servant getting from Rs. 5 to Rs. 6 per month with food and clothing found. There are others who act as retail merchants and sell the goods to the *Mandies*. At Hunsur, where there are about 9 such *Mandies*, 450 men in all were reported to be thus employed for the whole taluk, at about 50 men per *Mandy*. A similar number was given to me at Bannur, and I have actually seen some of the *Lubbeys* at the remotest corners of the State.

Kulavadies, etc., are paid mostly by number and not by weight, of hides and skins.

The *Kulavadies* and others receive money advances from the *Lubbey* dealers to the extent of about Rs. 15 at the maximum, on the distinct understanding that they should repay the debt in the form of hides and skins, at fixed prices, irrespective of weight. At Hunsur, cattle hides weighing about 25 lbs. would not fetch more than Rs. 3 and a buffaloe hide more than Rs. 3-4-0. At Saklespur, the Kulavadi sells the hides from Rs. 1-8-0 to Rs. 2-8-0 each. At Arkalgud from Rs. 2-8-0 to Rs. 3, at Koppa from Rs. 1-4-0 to Rs. 4 at the maximum, and at Thirthahalli from Rs. 2 to Rs. 3 and so on.

At all these places, the *Kulavadies* are made to believe that they are fairly paid, although they do not understand the spring balance, shown to them now and then.

Gains of the Agents or profits in the local trade in hides.

The *mandy* people who buy hides and skins brought to them buy at an average rate of 6 lbs. per rupee of buffaloe hide, and 5 lbs. or cow or bull. About 80 of these make up a cart load of 80 maunds. On an average, they will have to travel a distance of about 30 miles, as between Hunsur and Mysore, before their goods are railed. About 6 of these carts make up a waggon of the Southern Mahratta Railway. It costs about Rs. 40 in all for these 480 hides to reach Bangalore or Re. 0-1-4 each or 2½ to 3 pies for 4 lbs. They are sold there at an average rate of about 3½ lbs. per rupee, and, allowing about 12½ per cent for loss of weight by drying, every 3½ lbs. delivered at Bangalore would mean 4 lbs. as collected at Hunsur. The *mandy* men at Hunsur buy the hides at an average rate of about 5½ lbs. per rupee and the same fetches him a value of about Rs. 1-6-0 at Bangalore. From this will have to be deducted the 3½ per cent commission for sale Re. 0-0-7 and transit charges Re. 0-1-4 and leaving a net profit of at least 4 annas for every rupee in favour of the owner of the *mandy* at Hunsur. At almost every place at which enquiries were made the same or very nearly the same average rate was given and hence the calculation for Hunsur might be taken as the average profit of the merchant maintaining stores of hides at Taluk Headquarters and at important villages in the State, taken as that at Hunsur.

Gains of the cooly *lubbey*.

In the case of the canvassing or cooly lubbery, the profits are still greater. He buys a hide at an upset price of a maximum of about Rs. 3 for an average weight of about 25 lbs. or a little over 8 lbs. per rupee. He keeps a small store in the village and sells the accumulated goods to the nearest *Mandi* owner, incurring a maximum carting charge of about Rs. 4 for 80 hides which works to about 3 pies per 8 lbs. For the 8 lbs. which he buys for Re. 1, he receives Rs. 1-8-0 or a

What the *kulavadi* might earn.

little over and realises a net profit of Re. 0-8-0. Thus, the *Kuluwadi*, for want of knowledge of the trade, of capital and of business organisation, loses about Re. 1-12-0 on every hide he sells for Rs. 3. Moreover the *Kuluwadi* has to pay a very exhorbitant rate of interest on the small loan he has taken and, being quite innocent of all calculations, is always in debt to his creditor.

Scale of profits in the business.

Twenty-five lbs. are taken as an average weight of the hide and a little over 12½ per cent is allowed for loss on drying, with a net weight of about 21 lbs. at Bangalore. Sale price at Bangalore is taken at 3½ lbs. per rupee or Rs. 6 for 21 lbs. From this will have to be deducted the commission sale at 3½ per cent or 7 pies in the rupee which amounts to about Re. 0-3-6, on a hide. Transit charges to Bangalore would, on an average, amount to Rs. 40 for 480 hides or Re, 0-1-4 per hide. The total charges on one hide amount to about Re. 0-5-0 in round numbers or about 2½ pies per lb. tanned.

It will thus be seen that a hide of about 24 lbs. bought at Rs. 5-11-0 at Hunsur will just pay its way when it reaches Bangalore, and the Hunsur rate then would be Re. 0-3-9½ per lb. or 4½ lbs. per rupee. Every addition of ½ lb. to the weight of hide over and above 4½ lbs. bought per rupee at Hunsur would add 6 annas to the profits.

Hide bought at 4½ lbs. per rupee or at Re. 0-3-6 per lb. will yield a profit of 3½ pies per lb. or 0-7-0 per hide. Similarly :—

5	lbs. bought per rupee	at 3¼ as.	per lb.	give a profit of	6½ ps. * or Re. 0-13-0 per hide.
5½	lbs. ,,	at 3 as.	,,	,,	9½ ps. or Re. 1-3-0 per hide.
6	lbs. ,,	at 2¾ as.	,,	,,	Re. 0-1-½ or Re. 1-9-0 per hide.
6½	lbs. ,,	at 2½ as.	,,	,,	Re. 0-1-3½ or Re. 1-15-0 per hide.
8	lbs. ,,	at 2 as.	,,	,,	Re. 0-1-2½ or Re. 2-11-0 per hide.

Profits in skin trade

Adopting a similar method of calculation in the case of skins of goats and sheep we have :—

Suppose that one cart load of 500 skins weighs about 80 maunds of 24 lbs. each and 6 cart loads of 3,000 skins weigh 480 maunds or nearly 5 tons.

Most of the skins are sent to Madras and the railway fair per waggon to Madras would be Rs. 60 thus making the total transit charges Rs. 84 for 3,000 skins, which works to about 5 pies per skin or say ½ an anna, in round figure.

Profits on one hide or skin.

The weight of the skin according to the above figures is 4 lbs. each. Assuming the loss by drying to be half pound at 12½ per cent, the net weight will be 3½ lbs. and the usual price at Madras is about 7 annas per lb. Transit charges amount to 6 pies per 4 pounds. Commission at 3½ per cent comes to ⅞ths of an anna or 10½ pies or a total expense of anna one and pies four and a half per skin, leaving a net balance of Re. 1-7-1½ per skin, from which will have to be deducted the cost of the skin at Hunsur and this will be Re. 1 on an average at rates favourable to the seller, leaving a profit of at least Re. 0-7-0 per skin or exactly 2 annas per lb. on the 3½ lbs. sold or 1¾ of an anna profit on every pound collected. Thus it is seen that the *Mandy* dealers realise a profit of Re. 1-12-0 at least on every hide and about 7 to 8 annas on every skin.

As sale is effected in England once in every 40 days, the money is turned over at least 9 times a year.

* Per pound.

The rates of profit mentioned above namely Rs. 1-12-0 per hide is on material worth about Rs. 4-8-0 and it is earned once in 40 days. In the case of skins the rate of profit of 7 to 8 annas in the rupee is 50 per cent in 40 days.

Mysore trade in hides and skins.

The trade in skins is more extensive in Mysore than in hides. From actual inspection of account books maintained by the *Lubbey* merchants owning *Mandies* in different parts of the State, I have arrived at an average of Rs. 15,000 per annum as the value of such trading per *Mandy* or about a lakh of rupees for each taluk. The profits earned are therefore something very considerable. The Government gets nothing at all from this huge traffic in the local hides and skins.

Suggestions.

Arrangements should be made to keep the *Kuluwadis* and ryots fully informed of the actual selling rates of the hides at the taluk headquarters and at Bangalore and this might be done by beats of the tom tom.

The weighing of the hides should be done by using the usual scale pans with standard weights. The local *Holeyar* and *Mussalman* population should be induced and encouraged to enter into this highly lucrative field of business.

It is sad to reflect that such a remunerative field of employment is left out to be exploited almost solely by an alien population. It is no doubt true that the business is abnoxious to the orthodox Hindu. But the *Mussalmans*, *Madigars* and *Holeyars* have no objection whatever to handle skins and hides or to deal n them. The *Holeyar* population is about 6,13,248 in number. There are about 3 lakhs of *Madigars* in the State who are by tradition workers in leather, with hardly one in 20 following the profession now. There is therefore large room for the *Madigars* to enter into this field.

There are a little over 3·14 lakhs of Mussalmans in the State, including the Civil and Military Station, many of whom understand the trade in hides and skins. It is very desirable that these with the *Madigars* and *Holeyars* should be educated to understand the value of the trade. This information is more valuable to them and hence leading men in the community might be brought together at important centres and lectured on the subject.

I would put this work before any scheme to provide them with literary education. Some well-to-do *Mussalmans* and *Madigars* might be explained the advantages of learning the tanning industry.

Raw materials are available.

Of the raw materials necessary for the tanning industry the following are found in the State:—

Hides, skins, thangadi bark, gallnut, oil, and chunam.

Men are available they require business information.

The men who can readily take to it are also *Mussalmans and Madigars* with some *Holeyars* and we have a good number of them. What is required is energy on the part of the people, and knowledge of the profits in the trade or in tanning, if they could command organisation and capital.

Water to be tested at several places for tanning.

The quality of water might be tested as to its fitness for tanning in such places as Mysore, Chintamani, Tiptur, Shimoga, Bowringpet and others where hides and skins are to be had in large quantities and also tanning bark and gall nut. This examination of water is a very important preliminary work, as bark tanning of hides is very much affected by the quality of water.

Reviving the tanning of skins desirable.

As the quantity of skins is much greater than hides and as most of which is exported, it is highly desirable that the suggestion to revive tanning of skins in the State is given full consideration.

There are 1,287 *Mochis* in the State nearly 40 per cent of them have given up their old hereditary occupation of preparing shoes, etc.

Industrial School should be started to teach and train the local *Madigars*, *Mochi* and *Holeyars* and *Mussalmans* in the methods of dressing or tanning hides and skins and in preparing better sorts of articles, such as harness, reins, bed straps, belts and so on.

Diffusion of information.

For want of such trained men, the Mysore Tannery Limited is now getting its stitching work done at Madras. This diffusion of information of the value of trade in hides and skins is the first work that has to be done in this line.

Starting of industrial schools to train local men.

Encouraging the people to start tanneries is another work waiting to be done in this line. Starting of industrial schools for leather work most in demand here is the third work.

I would suggest the formation of a special Sub-Committee to investigate all these points thoroughly and to suggest a practical working scheme.

Production and value of *thangadi* bark, in the State.

The export of 1,60,000 and odd maunds of tanning bark during the year 1910-11 is sufficient indication of the large quantity of production of that material in the State. For, the various bark tanneries in the Province consume not less than about 2 lakhs of maunds per year and this must be met from the local supply since the import by railway into the State was only about 7,400 maunds. It is thus seen that the production of the tanning bark in Mysore reaches up to about 4 lakhs of maunds, which at about Rs. 3 per maund, would be worth about 11 to 12 lakhs of rupees.

Method of collecting the bark.

Thangadi bark is collected in the State under contract for three years at a time. The *Lubbeys* of Vaniambadi have practically the sole monopoly in this trade, as well as in hides and skins. They engage local men to collect the bark.

Quantity collected by one man.

One man takes 2 days to cut the plants, peel off the bark, and collect about 2 maunds of 34 lbs. each, wet. These, when dried yield about one maund, A considerable amount of money is spent on coolies.

Collection charges.

On enquiry I find that the cost of collection and transport is apportioned roughly as follows:—One fourth on cooly, one fourth on supervision, one twenty fourth on cart hire and the remaining $\frac{11}{24}$ths as assessments to Government. For

Per Bengal maund of dried bark collected.

one Bengal maund, the amounts under these heads and in the above proportion are given to be nearly 12 annas under each of the first 2 heads, 2 annas under cart hire, and Rs. 1-4-0 as assessment to Government, making a total of Rs. 2-14-0 per Bengal maund leaving a margin of about two annas per maund to the collector.

For the total Mysore collection.

The 4 and odd lakhs of Bengal maunds of bark collected in the State would mean about 3 lakhs of rupees being spent on coolies and another 3 lakhs on supervision, about 50,000 rupees on cart hire.

For all the risk and initial out-lay in the shape of advances to thousands of ryot coolies, the contractor is well repaid in the form of substantial profit. The ryot population are also benefitted since they work on these, when not otherwise engaged in their agricultural operations.

Bulk of bark transported is large

The great bulk and the long lead in many cases to the nearest Railway Station entails a very great expense in the shape of cart hire. One contractor at Dharmapuri, who lives at Sira, now and then, appears to have signified his readiness to subscribe about Rs. 20,000 towards any light railway that might be run between Challakere and Tumkur.

It could be saved by extraction of tannin.

If the tannin in the bark could be extracted, all this transport in bulk could be avoided,

Besides *Thangadi* or cassia aturiculata, there are various other tanning materials in the State from which the tannin could be extracted and utilised not only locally but exported as well.

Such tannin extracts are portable and they also shorten the process of tanning to a few weeks.

Tannin extracts also shorten tanning process.

The various steps of the process of extraction are, (1) the bark or wood is cut into small pieces by machinery, (2) the tannin extracted from the chips by the action of hot water or steam, (3) the colouring matter is removed by special processes and lastly (4) the extract is filtered mechanically and evaporated in vacuum pans.

Steps in tannin extraction

The most important condition necessary for the success of a factory for preparing tannin extracts is proximity to the forest.

Condition necessary for success of a tannin factory.

Mr. Troupe also mentions a particular method of tannin extraction, as being most suitable to India, inasmuch as the process requires no chemicals, is very simple and produces good qualities of extracts with a high percentage of tannin. (Forest Utilisation by Troupe).

It appears that the rough and ready method of manufacturing cutch is also applicable to extracting tannin. The general principle being to heat the chips or shavings with water and continue heating the liquor obtained with successive fresh layers of chips. It is essential that the chips should be very fine, pounded in the csse of bark, and converted into shavings in the case of wood.

Matti wood or terminalia tomentosa is available in large quantities in Mysore, and is according to Mr. Troupe, one of the two considered likely to prove of commercial success in India. Mr. Muthanna, R. B., estimates a likely annual yield of about 2 lakhs of c.ft. in the Forests of Mysore, Shimoga and Kadur.

Matti wood available.

Below are given the names of a few trees of the Mysore State from which tannin could be extracted. (1) *kempudhoopa* or Shoria robusta or *sal* bark. The bark yields from 17 to 20 per cent of tannin, (2) *Dhoopa* or Vateria indica. According to Dr. Leather, the fruits of these trees yield about 25 per cent of tannin, 12 per cent of which being soluble in water, (3) *Mauv* or Magnifera indica, has 16 per cent tannin, (4) *Jalli* or Acacia arabica, the bark of which contains about 17 per cent (5) *Kagli* or Acacia catechu, both the bark and the wood of which yield tannin and when concentrated 60 to 70 per cent of tannin can be obtained, (6) *Bilijali* or Acacia leucofolia, the bark of this tree contains 21 per cent tannin (the wood of this tree according to Dr. Troupe may possibly be of use for wood pulp, (7) *Thangadi* [or cassia auriculata, the bark of this contains according to Mr. Hooper 11 to 20 per cent of tannin. *Alale*, Terminalia Chebula, the fruits of this tree yield from 31 to 43 per cent of tannin.

Some Mysore resources in tanning materials.

Instead of exporting the fruit, a pale coloured extract can be made and sent, thus increasing many times the present price of this raw material. Even the bark of this tree yields from 27·5 to 34·9 of tannin.

The Conservator of Forests estimates that about 50 thousand maunds of nut could be had every year. The solid extract of tannin might be prepared, as has been done at Raniganj in Bengal and the material exported.

CHAPTER VIII.

WORKING IN METALS.

Brass and Copper.

Casting and sheet metal work are carried on to some extent at four places in the Province, *viz.*, Magadi in the Bangalore district, Nagamangala in the Mysore district, Sravanabelagola in the Hassan district and at Seethakal and Yelekyatanahalli in the Tumkur district, and on a smaller scale in Bangalore and Mysore.

Magadi.

There are 7 workers at Magadi who buy old brass vessels at about Rs. 7 per maund of 24 lbs., and cast them either into lamp-stands suited to the ordinary Hindu household, or into candle-stands after the pattern of those now being imported.

Method of work.

The articles are prepared in three stages. Firstly, a core of mud is made of the shape of the inner surface of the intended hollow casting of metal and turned true; secondly, a lining of bees wax is laid over this turned surface and of the thickness of the casting required and turned true under a bowlathe and, lastly, an outer layer of mud superimposed on to this wax lining.

Two openings are left, one at the bottom for the melted wax to be run out and the other near the top for the molten metal to be poured in, a coating of rough mud is now put on and the whole carefully dried. The mould is next heated and the bottom opening opened to allow the molten bees wax to run out, leaving a hollow or mould of the size and shape required. The molten brass is next run in through the opening on the top and after it is cooled, the earth inside and outside is removed. The cast article is then roughly filed by hand and turned under a strong lathe worked by two men.

Quantity of raw materials used and values.

About four maunds of brass are thus cast into articles every month at every one of these seven houses at Magadi. One bag of charcoal costing from six to eight annas per bag is required for every maund thus worked or 336 bags of Rs. 168 in value per year. Seven to ten seers of bees wax are required for every maund at first and half of it is nearly lost at each casting. On an average, about 5 seers or $\frac{1}{8}$th of a maund of bees wax is required for every maund of metal worked up, or 42 maunds per year of about Rs. 840 in value.

Two coolies, Rs. 5 per month each, are maintained by each worker.

Economic condition of the metal worker at Magadi.

Every maund of metal got at Rs. 7 requires about annas 8 worth of charcoal, Rs. 2-8-0 worth of bees wax and $2\frac{1}{2}$ rupees cooly, to cast and work the alloy into lamp-stands, the value of the articles being about Rs. 14 for every maund. It is thus seen that the metal worker gets Re. 1-8-0 per maund or Rs. 6 for every 4 maunds worked in one month and that he is only slightly better off, in point of income, than the cooly working under him, the only advantage being an increase of earnings to the family, if one or both the coolies happened to be members thereof.

The articles prepared are bought by Marwadis of Bangalore and sold by them at Rs. 15 per maund. Each worker can add Rs. 2 more to his income, if all of them combine add sell their articles through one of themselves stationed in Bangalore. But here, as in every other cottage industry in the State, the worker is in financial difficulties from having contracted debts or received advances of money from the purchasing money lenders.

Suggestion.

It may be noticed that there is a considerable amount of waste of time and energy on the part of the metal worker at Magadi, inasmuch as he has to prepare a mould in the manner detailed above every time an article is cast, even though all the articles might be perfectly similar or alike. The question naturally suggests itself whether nearly half the time could not be saved, if the metal is run into a mould made up of a moveable outer covering or shell of metal in two halves and an inner earthy core, provided the two halves could be separated, on the cooling of the casting. The inner core of earth can be easily removed. The two streaks that would mark the junction of the two joints of the two halves of the outer shell on the whole mould can be filed off or removed by the lathe. The preparation of the inner cast or core of earth is not required each time, since several such can be prepared and kept in stock, with a bar of iron through each to facilitate the removal of the earth from the casting. This would certainly enhance the quantity of production.

I would propose that an experiment on the lines indicated might be got done in one of the foundries in Bangalore. If successful, it can be introduced into Magadi as well as at Nagamangala. The suggestion made above would apply only to symmetrically shaped articles of simple design.

Nagamangala.

At Nagamangala the metal casting work is much more varied and extensive than at Magadi. There were six workers originally at Nagamangala, the number being now increased to sixteen. The casting is mostly in brass, to a smaller extent in copper and in bell metal. Work in sheet metal is also carried on to some extent.

Articles prepared.

The articles prepared from castings of brass are images of the various Hindu God-heads, *vahanams* or riding animals of particular Hindu Gods, lamp-stands suited to burning seed-oil and to kerosine oil, candle-stands, tumblers, large sized sounding bells, *lotas*, cups, boxes, *Brindavanams*, *Mandasanam*, etc., while the articles prepared in sheet metal are *Prabhavalies* for idols, metal carvings after the manner of armaments, etc.

Articles in greatest demand are the candle stands, bracketted wall lamps, figure lamps and ordinary lamp stands, like those of Magadi.

Second hand brass vessels from Mysore and Sravanabelagola are bought at Rs. 7 per maund, as at Magadi, and each worker casts about one maund per month and the loss of metal in casting, filing and moulding, etc., amounting to about 25 per cent.

The methods of preparing the moulds and of casting are exactly similar to those practised at Magadi, and suitable changes are made for casting solid figures or objects. Crucibles required for melting brass are prepared locally, the same being used thrice over. A mould prepared for any one article can also be used thrice over, provided it is not allowed to cool, in which case it is rendered useless. Two lathes are used here also, one for wax termed *Naracha* and worked by the operator himself, by a bowlathe whereas the other kind known as *Cheriki* is for turning the castings and is worked by two men, as at Magadi.

About 10 to 7 seers of bees wax are required for the moulds to cast one maund of brass and half the quantity used each time is lost during melting; nearly 5 seers or $\frac{1}{8}$th of a maund of wax is thus sufficient for every maund of brass cast.

Working expenses.

The monthly expenditure amounts to nearly Rs. 12 for each establishment; Rupess $2\frac{1}{2}$ for wax, annas 4 for charcoal, annas 4 for cowdung cakes, annas 2 for fire-wood and annas 5 cooly and the value of the brass at Rs. 7 per maund together with Re. 1 more to keep up the loss at the various casting.

Articles in great demand.

The articles in greatest demand take one week for wax work only, and another week for the work in mud inside the casting and the outside coatings. Two more days are required for preparing and casting, four or five days for filing and two days for turning. Finally five or six days are spent in improving the defects of the casting thus making up a month.

Sale values.

The solid brass images or *Vigrahas* are sold by weight as shown in the Table below:—

Name of article	Weight in seers of 24 tolas	Days taken	Sale value	Rate per day of working, excluding cost of materials	Rate per seer
			Rs.	Rs. a. p.	Rs. a. p.
Veerabhadra	1½	9	6	0 10 0	4 0 0
Ganesha	1½	10	5	0 8 0	3 5 4
Nandeeswara	1¼	6	4	0 9 8	3 3 2
Lingasarpa	¾	1½	1	0 8 4	1 5 4
Basava	3	4	4	0 12 6	1 5 4
Basavanna	2½	4	2	0 5 0	0 13 0

Or an average of Rs. 2⅓ per seer of metal worked, the cost of the metal itself and materials not exceeding annas 5 *i.e.*, the sale value is between seven to eight times the cost of materials.

A few other articles are also sold by weight *viz.*, figure lamps, etc., varying from 9 to 10 annas per seer. An adjustable wall lamp weighs 16 seers, takes 8 days to prepare and fetches Rs. 10, the rate working to about 10 annas per seer. A candle stand weighing 12 seers is sold for Rs. 7-8-0. This occupies the worker about 8 days of his time, and fetches annas 10 per seer. A big lamp stand for kerosine oil weighing 15 seers is sold for Rs. 8-7-0 and takes about 8 days, the rate per seer, working to annas 9. Generally, in the case of the casting of simple articles, the daily wages charged range from 9 to 10½ annas and the same value per seer.

Suggestion.

It is seen that much time is lost in filing the cast. Time saving appliances in this direction are very desirable. Some saving of time can be effected, if iron or steel moulds can be prepared and used at least in the case of these articles which are in great demand, and which are more or less symmetrical.

The brass workers at Nagamangala appear to have made several attempts to burnish the articles produced, so as to make the polish last for a long time. They also wish to know the particular composition to improve the color of the brass. But it appears that in this direction much cannot be done, so long as they continue the present practice of getting their supply of brass as they do at present. The composition will vary considerably as they mix old brass vessels in all proportions and cast. A few other improvements might be made:—

(1) They might lessen complexity and details in the *Vigrahas*:

(2) They may, with great advantage, adopt similar patterns for the images:

And (3) also introduce casting of figures and idols suited to European tastes.

Sheet metal working.

The articles prepared out of sheet metal are, Prabhavali, Umbrella, Suryahara, Sankha, Chakra, plating over doorways in temples, etc. Cooking vessels are not prepared at all. *Vahanas*, *Vimanas*, *Mantapas*, big elephants, *Basavas* and horses are also prepared. One *Prabhavali* that I noticed there was made up of six parts rivetted together. Among the large sized articles prepared out of a sheet metal might be mentioned a *Mantapam* valued at Rs. 600. A peacock, weighing about 8 maunds of brass sheets is valued at Rs. 250. An elephant made of thick sheet weighing 16 maunds is valued at Rs. 500. A *Basava* weighing about 4 maunds costs about 150. Such big sized articles as *Vahanams*, etc., were supplied to Arsikere, Banavar, Birur, Chiknayakanhalli and Gubbi. They have prepared a very big costly article of silver valued at Rs. 10,000 which took the workers about 4 years to finish.

Bell metal.

Very little work is done in bell metal. They do not prepare the alloy but their supply is obtained from purchasing second hand articles, old and worn out dining plates, of bell metal sold at 6 annas per seer. They cast the alloy into *lotas*, *kujas*, *tumblers*, and sell them at 14 annas per seer.

Economic condition of the metal workers of Nagamangala.

The economic condition of the metal workers of Nagamangala is anything but satisfactory. They are steeped in debts. An attempt at Industrial Co-operation was made about 10 years ago but the out break of plague interfered with the materialisation of the scheme. A working capital of about Rs. 2,000 would enable them to earn a very decent income, especially if they confine their work mostly to preparing such articles as lamp stands, wall brackets, figure lamps, candle stands and others.

Sravanabelagola.

About 500 persons are engaged at Sravanabelagola in working sheet metal, brass and copper, into vessels for domestice use of the Hindu household. Brass vessels constitute the greater bulk of the production those in copper ranking next, with only one man working at bell metal. It is reported that about 10,000 maunds of brass sheets are consumed per year in this area, much of it being imported from Tiptur and French Rocks Stations, at rates varying from Rs. 10-8-0 to Rs. 12 per maund. The brass is melted and beaten out into thick bases or bottoms of vessels. Over 1,000 maunds of copper sheets at Rs. 12-0-0 to Rs. 12-8-0 per maund are also reported to be consumed every year.

Workmen mostly local.

Excepting the 20 to 25 workers in copper who come from Goa and work for about 4 months during the year, all the others are natives of the place. Most of the Mussalmans of the village are poor and work as coolies in this industry. Poor Hindu ryots, mostly Jains, are also engaged as such. Some of the local men are working in copper and are encouraged.

Their earnings.

On an average, the coolies get about 8 annas per day and the boys from 2 to 4 annas. The Goa men are brought by *Maistries*. They earn a decent amount after paying the coolies brought with them.

Method of work.

There are two methods of work in vogue among the metal workers at Sravanabelagola. According to one of them, known as *Rasi bitti*, metal of about 15 maunds is supplied to the worker and he returns an equal weight of vessels and receives in return Rs. 4-0-0 or Rs. 4-4-0 per maund. The fuel and cooly are his own. According to another system, known as *Sala bitti*, metal, charcoal, etc., are supplied by the Sowcar and also Rs. 2 paid per maund. This worker is chiefly indebted to the Sowcar to the extent of Rs. 100 or more. The actual expenses amount to about Rs. 1-12-0 and the worker gets from 4 annas to 8 annas for every maund he works. Charcoal fuel is used and it costs about one rupee per maund of metal worked, if the metal is made out of the brass cast locally from old

metal and the consumption of charcoal for about 10,000 maunds of the yellow metal worked in this place is something respectable. The charcoal from wood is sold ordinarily at 400 seers per rupee and at Rs. 2-8-0 during the rains for the same quantity. Domestic charcoal is supplied from distances of 12 miles from the place and cost usually 12 annas per 400 seers. Thus 10,000 maunds of brass work at Sravanabelagola require a quantity of fuel valued at about Rs. 10,000. The 1,000 maunds of copper worked consume about Rs. 500 worth of fuel.

From enquiries made of the leading men assembled at Belagola during my visit, I gathered that about 20,000 maunds of the yellow alloy are converted into vessels at Belagola and in the neighbouring villages put together, with a corresponding quantity of charcoal consumption, which is not less than about Rs. 20,000 worth every year. 200 measures of charcoal form one bullock load and Re. 1 means 2 bullock loads. 20,000 maunds of metal worked consumes about 40,000 bullock loads of charcoal worth Rs. 20,000.

Copper smiths from Goa.

Copper-smiths from Goa are paid Re. 1-12-0 per maund of *Rasi bitti*. They take this low rate of Re. 1-12-0 instead of Rs. 4-4-0, inasmuch as the weight of iron used at the lip of the vessel is included in the total weight and if this is excluded, they require the same Rs. 4 per maund.

There is one man who has settled down here from Coimbatore who works in bell metal and he works according to the *Rasi bitti system*, payment in this case being Rs. 6 per maund of 48 seers. 150 maunds of bell metal are stated to be worked every year and sold at Rs. 27 to Rs. 28 per maund.

Suggestions.

Pressed and turned metal work might be introduced at Sravanabelagola, Nagamangala and Seethakal and in several places of the State.

One of the Superintendents of the Industries and Commerce might be deputed to study metal working in general at Poona, Bombay, Solapur, Lahore, Madura and Dindigal and other places, with a view to introduce such of them as might be practicable.

Toy articles made of brass wire

A few Musalmans of Bangalore prepare some toy articles of brass wire and hawk them about at the Railway Stations and at market places.

Articles prepared are :—Walking sticks of brass wire with a core of thin iron rod inside ; toy pen-holders, etc.

Iron and Steel.

There are two foundries in Bangalore where some casting work is done and articles like ornamental railings, stands for garden seats, etc., are prepared.

One of them, Messrs Mackenzie & Co., use electric power while the other, Messrs. Rickie & Co., utilise that developed by steam.

Past local attempts at foundry work.

At a village known as Birasandra, 9 miles to the west of Devanhalli and on the road to Dodballapur, there was an old foundry started about 20 years ago for casting iron rollers for sugarcane. It worked for some time and then ceased owing to some misunderstanding between the partners. Materials for casting consisted of old rails and new English, in the ratio of 60 to 30, and the blower was being worked by a small engine.

The machinery is all rusting at present and this is an instance of loss incurred for want of proper guidance.

The old foundry at Chikballapur, though not bad, is steadily on the decline and is only a workshop for repairs. It appears also there are a few oil engines

bought by ryots at Madagiri and Shimoga and that they are not working for want of proper guidance.

There is a huge oil mill at Tumkur which was intended to be worked by steam engine. The whole of this is in a rusty condition. The rice and saw mills in the Mysore City owned by one old mechanic from the Perambur workshops was all in rust till recently.

At Channarayapatna there are two workshops for repairing sugarcane mills, one of which is a branch of the bigger firm at Chikballapur, whereas the other was recently started by a Mussalman who proposes to do some foundry work on a small scale, with the help of an engine of about 3 H. P. to work the blower. Each of these firms repairs about 400 to 500 mills per year at Re. 1 per set. They also get rollers from Madras and Calcutta and sell.

The repairing and regrooving the mills is to be done for every 1,200 maunds of jaggery prepared from the juice got by crushing therewith. Two of the rollers do not last for more than 8 seasons and they have to be replaced. It appears that there are about 1,000 mills round about Channarayapatna.

Similar repairing establishments are also maintained at other important sugar-cane growing centres, like Hiresave, etc.

Musical Wire Drawing.

It is reported that this industry, peculiar to Channapatna, began to flourish during the reign of Hyder Ali. It would appear that he sent the wire to Delhi and created a demand for it.

The special character of the wire was due to the peculiar tempering and the high class local steel used, *viz.*, the old Indian " Wootz." The industry declined owing to decrease in demand for the wire, and the difficulty of getting a proper kind of steel, the local industry of making steel from the Mysore-made superior wrought iron, having practically died out. The workers have decreased in number and the skill is also being lost. A substitute for the steel is now used and attempts are being made to revive the industry, on a small scale.

The workmen buy some good imported steel, beat them into thin rods and draw them out thinner and thinner, through various sized holes in a wire-drawing plate, just as they draw silver wire in Bangalore.

After the required thinness is obtained, the wire is tempered by being heated in a butt of molten tin and cooled slowly in a dry chamber. It is kept from rusting by being immersed in a quick-lime powder.

By adopting the capstan method of drawing wire, the yield is increased from 5 to 14 tolas per man per day.

The questions of regarding it as an industry and of developing it, if need be, are matters requiring further investigation. It is stated that the German Piano makers prize it highly and that there is a demand for it all over India.

Silver and Gold.

About fifty families of silver smiths in Bangalore are engaged in drawing silver and gold wire, some of whom use also small steel rollers for rolling gold into ribbons, which are subsequently worked into ornaments.

Wire drawing as well as the rolling into ribbons are done by hand labour.

The metal to be drawn into wire is first hammered into a short stick, tapeing at one end to permit of its being passed through the desired hole in the wire drawing plate and the stick is drawn by a pair of pincers, the other end of which is fastened to a wire or rope, wound round a wooden beam turned by temporary capstan heads inserted into holes in the beam and worked by two men. As the length of the wire increases, it is wound round the beam itself and the process continued.

About 500 tolas of silver are reported to be thus worked every day in Bangalore.

The work of rolling metal into ribbons is confined to gold and the two rollers measure $5\frac{1}{2}'' \times 3\frac{1}{2}''$.

One sovereign weight of gold was rolled into a ribbon 8 feet long and $\frac{1}{8}''$ wide in five minutes; the gold having been first beaten into a ribbon 9" long by hammering and another piece $2'' \times 1\frac{1}{4}''$ of about seven sovereigns weight was rolled into a robbin 12" long in 3 minutes, while it would have taken four hours to do the same by the ordinary method. These rollers are not suited for silver work and the men want the size of each roller to be $9'' \times 4\frac{1}{2}''$.

CHAPTER IX.

CERAMIC INDUSTRIES.

Mangalore Tiles.

Manufacture of roofing and flooring tiles of the Mangalore pattern, of drain and sewer pipes, and of table moulded or fire bricks is carried on on a pretty large scale in "The City Tile Works," Bangalore. **The Bangalore City brick and tile works.**

This was started in 1895 with a capital of Rs. 3,50,000 subscribed chiefly by a few leading men of Madras. The plant consists of four pug mills, two runner mills, four presses and two kilns, one of them being continuous and the other intermittent, with the necessary frames and drying sheds. This is worked by two European experts with 15 carpenters and fitters.

Four hundred and sixteen coolies were engaged in these works, at 6 annas for adult males, 3 annas 6 pies for women and 2 annas 6 pies for boys. The labour is partly from the North Arcot and Vellore districts and partly local, females and boys being recruited from the Military Lines close-by. **Labour.**

Clay supply is obtained from a place near Yedoor, 4 miles from Bangalore and sand from a water-course on the Magadi road, 2½ miles from Bangalore. Both are supplied on contract, clay at 1 anna per *para*, 14 *paras* making up a cart load. 70 such cart loads are carted every day. Sand is supplied at 20 *paras* per rupee. **Raw materials.**

The machinery is all worked by steam engine of 200 H. P. and another of 25 H. P. It appears that electric power is not suited to the method of preparing tiles, as it is done in the City Brick Works, as the power actually consumed would vary with varying plasticities of the clay derived from various sources. It appears that presses can be worked by electric power but not the pug mill. **Power.**

The outturn of bricks is about 1½ lakhs per month, valued at Rs. 1,800 and about 2 lakhs of roofing tiles, valued at Rs. 8,000, and 25,000 flooring tiles valued at Rs. 1,000 or nearly Rs. 1,29,600 per annum. **Outturn.**

These bricks and tiles are sent to Tarikere, Arsikere, Shimoga, evidently for the Malnad and also to Bellary, Coimbatore, Madras, Anantapur and Bombay, as well as to Vizagapatam and Northern Circars of the Madras Presidency. **Market.**

Clay suitable for the manufacture of the Mangalore pattern tiles occurs in sufficient quantities in a few tank beds close to the Mysore City—bed of Dodkere, Hemkal village, and that of the tank between Humcha and Ramenahalli. At the rate of 1½ cubic yards of clay per 1,000 tiles, the clay supply would last for about 35 years for a factory capable of producing about a lakh per month. The Hemkal tank bed itself would keep up the factory for at least 20 years and that in the Humcha for another 15 years. **Clay for Mangalore tiles near Mysore.**

As regards the demand for tiles, Mysore City alone imported nearly 2½ lakhs of tiles in 1912, Bangalore City got from Calicut and Mangalore 1,520,000 in 1912 and 1,433,000 in 1911 and Bangalore Cantonment required about 3,50,000, thus making up a total of over 2,000,000, that is, the Mysore State needs a quantity of not less than this, after part of the local demands is met by the supply from the City Tile Works. The 2 lakhs of tiles per month or 24 lakhs per year of the production of tiles by the City Tile Works is not all consumed locally but is sent out of Mysore. Thus, there is room for one more decent sized Tile Factory in Mysore.

Other tile factories.

There are four smaller concerns for the manufacture of roofing tiles of the Mangalore pattern only; of which two are in Saklespur, one in Sringeri and one in Sagar.

Several attempts were made in the Bangalore City to start other tile factories but non with success. The industrial School at Mysore prepares tiles from clay occurring in areas round about Mysore City and sells them locally. Investigations are proceeding regarding the feasibility of establishing a Tile Factory at Mysore.

One at Saklespur

A tile factory was started at Saklespur about 15 years ago by 2 partners, one of whom, a native of Saklespur, provided the capital, while a retired Police Jamadar, a good machanic and a native of Calicut was the working partner, having learnt the process in Mangalore. The concern was not a success, and on the death of the working partner, it passed on to the other, who turned his attention to running the factory on a small scale. It has been working on this scale for the last 3 years. The machinery consisted of a press and roller mill, both worked by manual labour. The building is estimated at Rs. 500. The furnace is of a rude type, capable of burning 2,500 tiles at a time.

The clay required is obtained from the paddy fields leased out for a number of years. The fields contain alluvial clay, as they are situated on the banks of a river. The clay is excavated, heaped and allowed to *rot* on the fields for 6 months and allowed to rot further for another 6 months at the factory site. It is then crushed by manual labour under the two-roller crushing mill and pressed into tiles.

Six cart loads of the clay are brought every day at a cost of about Rs. 2 in all and stacked.

Six men and six women are engaged, the women being paid at 3 annas each and men at 6 annas.

Four hundred tiles are pressed in a day and dried in the frames in the shade for four or 5 days and for one day in the sun.

The furnace is charged with 2,500 tiles in 7 tires, with earth filled on top, instead of tiles and bricks. About 14 cart loads of fuel are consumed at Re. 1-4-0 per cart. The furnace is kept working for 27 hours and four to five days are allowed for cooling.

The concern cannot be worked for more than 5 months in the year, owing partly to the *malnad* rains and partly to labour difficulty experienced by the proprietor and he is not able to work for more than 3 months at a stretch and consequently the factory works continuously, without rest throughout this short period.

It costs the owner about Rs. 55 for preparing and burning 2,500 tiles or Rs. 22 per 1,000 and he sells them at Rs. 30 per 1,000. The quality of the tiles turned out of his factory might, in point of quality, be classed with those from Mangalore worth Rs. 20 to Rs. 25 per 1,000.

The demand for these tiles is reported to be increasing in the Saklespur taluk for two reasons. The country tiles prepared by the *Kumbars* or potters were found to soak heavily during rains, thereby increasing the weight of the roofing. The articles of local *Kumbars* were, consequently, not in great demand and they had to leave their profession and take to agriculture. Even the earthen pots required are now got from the Manjarabad side or from Belur and Alur. The second reason in favour of the greater demand for these tiles is that they are cheaper than country tiles, inasmuch as 4,000 country tiles costing Rs. 48 cover the

same area as 1,000 Mangalore tiles costing Rs. 30 There is also a saving in the cost of timber for roofiing, as the total weight of the Mangalore tiles is less than that of the country ones. The Mangalore tiles are thus found by the local people to be more effective against rains and also cheaper.

This concern has by no means been run as efficiently as it migh be. The owner is not fully conversant with the details of the business and he has not been experimenting on the quality or quantity of the earth available with a view to arrange for any continued working and on an extensive scale. The furnace is of the rudest type and there is heavy loss both in fuel and in the imperfect burning of the tiles and in heating the earth on top, instead of some other article such as bricks, etc. The furnace has to be improved, a pug mill worked by bullock power has to be introduced and the local men trained, to be free from difficulties in procuring sufficient labour. **Suggestion.**

This is a place worth a visit by the tile expert of the Conference, with a view to suggest more efficient appliances and methods being introduced and the working rendered more economical.

That there is great demand for Mangalore tiles in this part of the *malnad*, as reported above, is borne out by the import of Mangalore tiles every year to the extent of about 2 lakhs, at 50,000 tiles by each of three *dallalies* and another 50,000 through the return coffee carts of European planters. They are sold at Saklespur at Rs. 50 per 1,000, the cost price at Mangalore not exceeding Rs. 25, the balance of Rs. 25 being the cart hire at about Rs. 6 for 250 tiles. During the rainy season, the cart hire runs up to even 8 or 9 rupees for 250 tiles or Rs. 32 to 36 per 1,000, swelling up the price of Mangalore tiles by Rs. 8 to 12 more per 1,000.

There are another tile factory at Harehalli in the Saklespur taluk of the same magnitude, kind and type of working and under similar conditions. The concern was started by the same enterprising retired Police Jamadar with one pug-mill, a roller mill and press valued at Rs. 1,000 and building at another 1,000. The owner died and the concern is being worked by his widow and not with any degree of success. This place may also be visited by the tile expert. The resources of clay might be ascertained here and at Saklespur and suggestions made to run the factory more efficiently. **One at Hirehalli, Saklespur taluk.**

The tile factory at Sringeri was started in 1910 and is being worked up in a more business like manner than the two in the Saklespur taluk. **One at Sringeri.**

Eight men formed themselves into a Company with a capital of Rs. 8,000, three of whom paid their shares and Rs. 3,000 were collected while the others withdrew. Rs. 5,000 were then raised on loan at 12 per cent interest for 2 years and the Managing Partner feels the want for Rs. 8,000 more for improving and extending the works.

The factory is situated in Sringeri lands. The building, including the drying sheds, measures 215 feet by 20 feet, and costs Rs. 3,550 in all; drying frames Rs. 1,000, furnace Rs. 1,100, and Rs. 1,500 for machinery made up of 2 Crushing Roller Mills, 2 Presses, 1 Pug Mill.

About 40 persons are engaged every day and 2 pairs of buffaloes to work the Pug Mill. The monthly outturn is 15,000 tiles with 500 ridge tiles.

The clay required is obtained from the paddy fields, about 30 acres in extent, situated on the eastern bank of the Thunga, the factory being situated on the western. The sand required is got from the river. Both the clay and the sand are somewhat micaceous and shew numerous specks and spangles of this mineral.

The clay used is dug from a depth of 6 feet in the fields, the top layers being useless for the purpose.

Thirty-six cart loads of clay are quarried every day at a cost of 8 annas per cart or Rs. 18 in all. It is rotted for one year from July to July and then mixed with sand by 2 men helped by 2 women for watering. The mixing has to be repeated four times with the same mass. It is then rolled under a roller-mill by 6 men, 2 at each handle of the wheel and fed into the pug mill worked by 2 pairs of buffaloes.

One pair of buffaloes is yoked at each end of a long heavy beam working the pug mill, the beam being horizantal and the vertical axle with vanes being fixed to the centre of the level beam. The buffaloes walk round on a platform with the pug mill in the centre and turn the axle with the vanes.

The clay from the pug mill is then pressed into tiles under the press, worked by manual labour, and the tiles dried in the drying sheds for about 15 days during the rains, and for only 8 days during other seasons.

The kiln is charged with about 3,000 tiles at a time arranged in 8 tires of 6 rows each with 60 tiles in each row. The firing is kept up for 24 hours evening to evening. The kiln is fired 5 times in the month and yields about 15,000 tiles, of which 9,000 are of first class, sold at Rs. 35, per 1,000, 2,500 second class, at Rs. 30 and 2,250 third class, at about Rs. 25, the remainder being loss. The total income is about Rs. 521 per month including Rs. 50 for ridge tiles and deducting total expenses of Rs. 413 and Rs. 120 for interest and depreciation, the net income is on the minus side.

The concern would pay its way, if capital could be had at cheaper rates of interests.

Suggestion.

The Economic Conference is seriously investigating the subject of introducing the manufactures of Mangalore tiles into the State, and here is an attempt very earnestly made by practically one private individual, and his spirit of self-help and of sacrifice demonstrated. It is but right that the attempts should be encouraged by grant of loans at cheaper rates of interest.

The concern would pay and would enable the pioneer to expand the business.

The public encouraged by the success will then join hands and subscribe and a Joint Stock Company would become an accomplished fact.

As encouragement of existing industries is an item in the programme of the Conference, this concern at Sringeri is a fit and proper one for such encouragement and fully deserves help, as it has tried to help itself.

The Varada tile works, Yelagalale, Sagar

This is a partnership concern started in 1910 by 3 enterprising residents of Sagar to manufacture roofing tiles of the Mangalore pattern. They spent about Rs. 1,000 in experimenting with the local clay, with the help of trained men imported from Mangalore, started actual work in the middle of 1911 and have been continuing it since.

They have sunk about Rs. 2,000 on machinery, a pug mill costing about Rs. 400, one 2 roller mill Rs. 450, a press Rs. 1,200, 2 kilns Rs. 1,300, building and sheds about Rs. 1,000 and Rs. 500 for 2 pairs of buffaloes to work the pug mill.

Government have given them, free of rent, all the land required for buildings and works, have allowed them to quarry the clay also free of any Royalty and have reduced seiniorage on wood fuel from annas 4 to 2 per cart load.

The factory employs 20 persons in all, 10 of whom are from South Canara and 10 local.

The clay used is quarried from near the east bank of the river Varada, from below a depth of 2 feet from surface, and it appears to have been formed as an alluvial deposit on an old terrace of the river, as evidenced by the long narrow belt of pebble beds flanking the deposit on this eastern bank, as well as the other on the western.

The clay is stacked in 2 heaps, one of which was 2 years old at the time of my visit and the other 6 months, each heap capable of supplying about a lakh of tiles. The excavation is done by special sets of men temporarily engaged, at Rs. 4-8-0 for 2 yards cube or 8 c. yds.

The collection of earth is done during the months of June, August and September, while fire wood is stacked during April, May and June.

Till recently, tiles were prepared by the system of *amani* and now, on contract rates of Rs. 13-8-0 per 1,000 tiles first class, Rs. 10 for the second and Rs. 8 for the third. Sixteen of the 20 coolies are thus engaged, while the remaining four are utilized for various other works, such as, carting sand, looking after the buffaloes and so on. Under this contract system, the proprietors have to supply the coolies with the clay in stack, sand, fuel, buffaloes and oil.

The 2 kilns are charged and fired alternately, 5,000 tiles being the outturn per week. Thirtytwo tons of fuel are consumed every month or 300 tons in round numbers during the year of 9 months. Their estimated annual outturn is 1,80,000 tiles at 20,000 per month, for 9 working months in the year, except during the two of heavy rains and one of high winds.

The tiles are sold at Rs. 36 first class, Rs. 30 second class and Rs. 20 third class. The first class local tiles correspond to the third class tiles of Mangalore, priced at Rs. 25 there and Rs. 50 for delivery at Sagar, Rs. 25 being the cart hire, etc., for every 1,000 tiles imported. The same cartage and and other charges have to be incurred for the other classes of tiles as well. There is thus a saving of Rs. 14 per 1,000 in favour of the locally manufactured first class articles.

The Managers have ascertained that 100 tiles of the Mangalore pattern prepared by them and costing Rs. 3-8-0 cover the same area as 1,000 country tiles valued at Rs. 5, weigh only half as much, thus allowing the use of bamboos both for rafters and reepers. The import of Mangalore tiles through the *Ghats* have decreased by about 50 per cent during 1912, from about 2 lakhs in 1911 to nearly 1 lakh in 1912 and the local tile factory turned out 30,000 tiles and sold them, with 20,000 more in stock.

The weight of the tiles from the Varada Works is about 35 tolas more than the Mangalore ones.

Suggestion.

The owners want two concessions to be shown to them by Government, *viz.*, (1) Fuel to be allowed free of all cost, (2) Government to arrange to send to Sagar a competent *maistry* to instruct and train the local men.

The first of these requisitions would mean a loss to Government of about Rs. 72 per year now and perhaps Rs. 100 more in course of time. This is a very small amount compared with the magnitude of help required by similar concerns and may be granted.

The second request falls within the policy of Government to help and guide the Industrial concerns with technical help and guidance. Considering the extent of the enterprise shown by the partners, the second request is well worth being complied with.

Manufacture of Bangle Glass and of Bangles.

Till very recently, glass for bangles was being prepared in several places of the Mysore State, *viz.*, Molakalmuru, Muttod and Anivala in the Chitaldrug district, Julupalya and other villages in the Bagepalli taluk, Thimmasandra, Gazala-Hosahalli in the Sidlaghatta taluk, Kothapalli, Koratagere and Pavagada in Tumkur.

Bangle glass of 3 different colours, deep cobalt, blue, deep emerald green and deep black, was being manufactured at Molakalmuru in the Chitaldrug district.

Bangle glass.

"The furnace at Molakalmuru is situated in the open country, about a mile to the east of the town and about a furlong to the south of the road to Rayadroog. The older furnaces there were located in the thick ruined fort walls. At Anevala, in the Hosadroog Sub-taluk glass was being prepared till a few years ago. It was discontinued, as the people were prohibited by the Amrit Mahal Department, from gathering their supply of Soda from the usual tracts, as most of these tracts were subsequently reserved as grazing ground for Government cattle.

The materials used in the preparation of glass are earth-soda, quarts and two black powders, as colouring matter, one of which is a black oxide of copper, the other oxide of cobalt. The soda earth was brought from Kenchammanahalli, Rayadroog taluk, quartz collected locally and the copper oxide prepared locally by oxidizing pure metallic copper. The other black powder is brought from Rayadroog taluk, Bellary district.

At Molakalmuru.

The furnace at Molakalmuru is approximately in the form of a cylinder surmounted by a truncated cone of a short height, the smaller section of the cone constituting the top. The height of the cylindrical part is 12'-6" and its diameter 15'-0" whereas the height of the conical part is 4'-6" the diameter of its top measuring 2 feet 2 inches. A small circular opening about 9 inches in diameter lies in the centre of this top and forms the mouth of the furnace. At the height of about 4 feet from the base of the furnace, there is a circular platform projecting from the inner walls and towards the centre of the furnace, leaving an opening at the centre. There is a small opening to one side in the lower part of the walls of the furnace between its base and the platform and through this opening the furnace is lighted. Inside of the wall of the furnace is lined with pot stone, the thickness of the lining being about 18 inches. The outside is built of roughly burnt bricks.

The pots fully charged are piled up on the circular platform so as to form 8 rows, one above the other, the pots in each row breaking joint with those in rows above and below. The mouth of each pot is exposed to the centre of the furnace while its base is turned towards the wall, the entire pot having downward tilt towards the base. 22 pots make up a row, those forming the topmost row being of smaller size than the rest. The 176 pots thus piled up fill the furnace to a height of about 8 feet above the circular platform.

Fuel used is the ordinary jungle wood.

The furnace is kept under a steady fire. Fire wood is introduced in regular quantities and none put in till that in the furnace is completely burnt up into ashes. Irregular or imperfect burning of firewood is stated to retard the melting of the charge or to spoil the colour of the glass produced.

The fire in the furnace is gradually raised and kept for 8 days continuously, night and day, and is worked by shifts, 2 persons being present at each shift. When coloured glass is to be produced, the furnace is worked for 12 days. Three weeks are allowed for cooling, after which period the pots are taken out through the mouth of the furnace, which is now widened out.

By using a mixture of impure varieties of soda and quartz in the proportion of 2 to 1, a pale greenish yellow glass is obtained which is called *beeja*, meaning seed.

Deep cobalt glass is prepared by fusing a mixture in the proportion of 18 seers of the yellowish glass, 24 of the purer variety of earth soda and 12 of quartz with 12 tolas of cobalt oxide.

Green glass results from fusing a mixture of 18 seers of yellow glass, 24 of the purer variety of earth soda, and 12 of quartz, with 6 tolas of the colouring matter, black oxide of copper.

Four charges of 176 pots each are taken out every year.

The average weight of the glass in one pot is about one and one-sixth maunds of 24 lbs. per maund.

The total quantity of glass produced per year from this furnace is 821 maunds or slightly less than 9 tons.

The glass so prepared is not converted into bangles at Molakalmuru but is sold as such to bangle makers.

The price of the lump of glass depends upon its colour, blue being sold at Re. 1-8-0 per maund, green at about Re. 1-4-0 and black at Re. 1.

The total value of the different kinds of glass produced at Molakalmuru in any one year would amount to about Rs. 900 approximately, that is Rs. 100 per ton.

A mohatarfa tax of Rs. 6-6-0 per annum is paid by the owner of the furnace to* Government and a net profit of about Rs. 400 per annum is secured by the owner."

Bangles at Malebennur.

At Malebennur glass of two colours, blue and green, are imported from Ambala, Ferozpur or Pambdi near Hindupur, the blue constituting about 96 per cent and the green only 4 per cent of the total quantity. The lump of blue glass is sold from Rs. 5 to Rs. 5-6-0 per Bengal maund at Ambala and the railway charges amount to Rs. 3 per maund. There are three furnaces at Malebennur preparing bangles one of which has 8 *soges* or pots and each of the other two 6, making a total of 20 *soges* in all.

Suggestion.

These require about 3 Bengal maunds per day, 90 such per month or 1,080 per year of over Rs. 5,000 in value at Ambala and Rs. 3,000 more for railway charges. One of the manufacturers at Malebennur gets the glass from Ambala and supplies the other bangle making establishments there, as well as those at Aiynur, Anivala, Mattod. this additional quantity being about 1,000 Bengal maunds. The value of the raw glass thus imported amounts to a total of Rs. 10,000 and the railway fare to Rs. 6,000 or about 60 per cent of the value of the material itself. It appears therefore reasonable to suggest the desirability of some of the local makers of glass at Molakalmuru, Mulbagal or Bagepalli being induced and also helped to start the manufacture of coloured glasses of the kind imported from Ambala. An attempt in this direction will, besides merely saving the extra and avoidable cost of railway charges is likely to stimulate production of such glass in several other parts of the State to supply the whole of the local demand for glass for bangle making.

One of the raw materials necessary, *viz.*, quartz is available locally. The very large quantity—several thousands of tons—of cyanide dust of the Kolar Gold

* Record Vol. III, pp. 246-249, Mysore Geological Department.

Fields might be tried, as a substitute for quartz. The local supply of earth-soda* as from Mandya, Hosdurga, etc., might be collected, concentrated and used, as most of glass is to be coloured.

Fuel supply will be easy and economical if the factory be set up at Shimoga or Lakvalli, along with wood distillation plant.

A serious discussion of the points suggested appears to be warranted from the following considerations. There is a large local demand both for bangle glass and for imported bangles and the attempt does not displace the 7,660 local men already engaged in the profession or trade. On the other hand it is likely to develop both. The number of men engaged gives one an idea of the demand. The total import figures under this head for all India will also supply some information, regarding the quantity of import into the State, of bangles of foreign make and it is not less than a lakh of rupees for 1911-12 for the Mysore share.

Slate Pencils.

A small factory for slate pencil has been working at Tumkur for some time. The raw material used in clay and it is obtained from near Golhalli. The clay is powdered, lixivated, settled, pressed in pencils, then dried. The pencils do not appear to be well burnt and they snap away easily.

The Proprietor is himself a worker and he understands the business well and thus small gains are being realised by him.

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* An Indian Expert working the Chemical Factory at Mahim near Bombay and who did some work to the Gwalior State might be got out to study this question and to report and even if it does not pay to use the local supply of earth-soda, as suggested, it might be imported as is done by the glass factories in India.

CHAPTER X.

WORKING IN WOOD.

Besides the village carpenter working in the rural parts and providing the ryot with agricultural implements and also building houses for him, there are a few factories for working in wood in several important parts of the State.

Saw mills.

Power-worked saw-mills have been established in the Kolar Gold Fields and in Bangalore City and to a smaller extent, in the two Industrial Schools worked by Missionary bodies in the towns of Tumkur and Kolar. The Kolar Electrical Saw works were started with a view to supply the Gold Mines with the required sizes and scantlings of wood and the one in Bangalore City has not yet reached to its full working capacity.

The two Mission Industrial Schools work their sawing plant by oil engines of 6½ H. P. in Tumkur and 7½ H. P. in Kolar. Both the Institutions are using all the types of saws, *viz.*, the circular, the frame and the hand saws.

These power-worked saw mills in these schools have been established more with a view to afford useful and practical training to the students, than with any commercial object. Agricultural implements are, however, being prepared in the Kolar Industrial School, in addition to meeting occasional demands for furniture.

Suggestion.

It is very advisable that the more important industrial schools in the State should be supplied with power-saw mills and rapid and accurate working in wood fully taught.

Carpenter establishments.

Carpenters' workshops and country-cart factories are established in Bangalore, Tarikere, Hunsur, Tiptur and other trade centres in order to meet the local demands for country carts and for other articles required for the ryot. A few furniture factories are also working in the Bangalore City.

The average cost of a cart reaches up to Rs. 45 and is divided about equally in value between the wood in logs, the wages of the blacksmith, including iron materials and the wages of carpenters. Each factory produces, on an average, about 30 carts per year. Considering that there are about 2,38,000 carts in the Province and that the number has been rapidly increasing, it could be seen that the demand for carts is certainly very great.

There are 8 cart factories at Tarikere with 33 men engaged in them. 22 c.ft. of wood are used for one cart, different qualities being used for different parts of the cart at rates varying from 6 annas to Rs. 1-4-0 per c.ft. Wages and iron cost about Rs. 15. Each factory manufactures about 30 carts every year, of 6 to 7 months.

Much of the time of these can be saved if machinery be introduced for sawing and moulding, etc.

Suggestion.

A furniture factory might be set up either at Bangalore, Tarikere or Shimoga and high class articles produced therein.

Manufacture of the various parts of a cart with the help of power-worked saw mills would very greatly reduce the cost, besides avoiding a large waste of wood. Such a factory might be established at Tarikere or Shimoga.

Sandalwood work.

Sandalwood carving is an old indigenous work of fine art peculiar to Mysore. It is done by a class of workmen called *Gudigars* who live in Sagar and Sorab.

There are five families of *Gudigars* in Sagar and the total number of workmen amount to 16, excluding boys. In Sorab town there are six more houses with 15 adult males excluding boys and about an equal number of families is reported to be resident in six villages in the Sorab taluk.

The articles that are prepared are:—images of the various Hindu deities, animals, combs, fans, boxes, walking sticks, etc. A good deal of elaborate carving is introduced into almost every one of these articles and the details of the ornamentation are sometimes too elaborate and costly to fall within the reach of ordinary purchasers. They do not keep any decent stock for sale and begin to show their skill only when special orders are placed with them, with money advances. These people are also capable of working on ivory.

The industry is very much on the decline, owing partly to the absence of any large demand.

With a view to expand the business, a proposal was once made to establish in Bangalore or in Channapatna one or two families of these *Gudigars* for a few years and to get them to teach the art in all its details to some of the more intelligent of the boys of the carpenters' classes. Several of the *Gudigars* appear to be eager to settle down.

Suggestion. If they reduce the amount of detail and prepare idols, animals, etc., more true to nature, a large export trade might be developed. The reduction in the cost due to the adoption of plainer style of working and catering to the taste of the European market are likely to increase the demand.

Models might be supplied to them after which they might shape their work.

An old Artware Depot. An Artware Workshop and Depot was started in the Mysore City in the year 1895 or so, and various articles were being prepared therein, *viz.*, *Veenas*, *Thumboories*, boxes and others inlaid with ivory and black or rose wood. Some useful work was being done for a number of years, after which the firm was closed.

The owner remarked to me several years ago that he did not find the business a lucrative one and that he suffered loss.

Work in Ivory.

Work in ivory is being done on a small scale in the Mysore City. The Mussalman workers are advanced either money or ivory and the articles prepared are kept in stock under the care of the local officers of Government and given out when sales are effected.

Musical Instruments.

Manufacture of *Thumboori* and other string musical instruments is being carried on to some extent at Magadi in the Bangalore district.

Brahmins engaged in the business. The peculiar feature of this industry is that the work is done by Brahmins and is confined to them. There are four families of these men in *Tirumale*, a suburb of Magadi and three at Byramangala, between Bidadi and Hosahalli and two local men are also trained.

These Brahmin artists prepare *Thumboori*, *Veena* and *Sitar* at costs varying from Rs. 15 to 60 each, according to the nature of quantity and quality of the material used, such as ivory and also upon the ornamentation.

The *Sitars* are in great demand in Hyderabad, while the other two are required for local consumption. *Halasu* or jack wood is most used.

The nature of the work is such that very little saving could be effected by the use of machinery.

The people state that they are unable to meet the heavy demand for these articles, both from Mysore and outside.

Preparation of *Musical Instruments* might be one of the subjects to be taught in an industrial school, either at Bangalore or at Mysore. **Suggestion.**

Lac-turnery.

This is an old indigenous industry of Mysore, practised solely at the town of Channapatna by a class of people called *Chitragars*. Since the introduction of the subject in the local industrial school, boys of other classes trained in the school have taken to the profession and are earning an independent living. The wood used called *Hale* or *Eiji* grows largely on waste lands round about Channapatna and it is so abundant that it is used locally as fuel. It is soft and of fine grain, admitting of being turned under a bowlathe, worked by one hand. The people cut the logs and thick branches of the wood into smaller pieces, turn them under the lathe and apply variously coloured lac, by pressing it gently against the articles under the bowlathe, in which process the lac melts and coats the toys. By dexterous handling, various shades of colour are imparted to the different parts of the toys turned by the lathe.

The industrial school started by Government to encourage lac turnery and also the drawing of musical steel wire saved several families from ruin. Many of them earn but they are too poor to start a factory by themselves.

"The Channapatna Co-operative Lacquer Factory" was started in 1908 and it has been working since. Nine artizans enrolled themselves as members and took one share of Rs. 25 paying Re. 1 per month. They work 27 days in a month each member turning out 12 annas worth of toys every day. No supervision is necessary. The artizans work hard as they get more for greater work. Each artizan turns out not more than Rs. 25 worth of work each month. **A Co-operative factory.**

The factory artizans first utilised the Industrial School for their premises which also supplied raw material at one year's credit.

Dividends were paid at 15 per cent on paid-up capital, besides handsome bonus to artizans, house rent and honorarium of manager and pay of writer.

Samples were sent to firms in India and orders secured.

The present difficulty is to meet orders. Hence the hesitation to prepare illustrated catalogues and to advertise widely.

What is wanted now is a scheme for larger return in shorter time.

Suggestions were frequently made to expand the industry; one is to make it a cottage industry to be taken up during the spare time of ryots. The other is to introduce machinery.*

The difficulties in the way of treatment as cottage industry are:—Want of mechanical deftness in the ryots, difficulty in the supply of raw materials, and also difficulty in the collection and sale of toys. **Lac-turnery unsuited for a cottage industry.**

The travelling Agents of Messrs. Kirchner & Co., largest manufacturers of wood working machinery, visited Channapatna and recommended certain machines, including an oil engine, at a total cost of Rs. 5,000. Rupees 1,000 more are required for working expenses. The Society thus wants Rs. 6,000 as loan without interest and repayable in a few years on the mortgage of machinery.

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* An Oil Engine of 6½ H. P. has since been introduced in the Industrial School.

Introducing lacquer work—A suggestion.

A study of the industry at Channapatna and of the extract appended on true lacquer work of Burma and Japan suggests the desirability of investigating the question of the possibility of introducing the latter industry into the State. Bamboo and *thitsi* are the raw materials for lacquer ware. If *thitsi* or any juice approaching it could be had in the forests of the State, the industry can easily be introduced. An expert might be deputed to study the question both in Burma and locally.

An extract is given below giving an account of the Burmese Art :—

(Extract from Vol. XXII, No. 254, Indian Textile Journal, for November 1911.)

An article in the latest Bulletin of the Imperial Institute deals, in an interesting manner, with Burmese black varnish or lacquer and with the lacquer ware and glass mosaics of Burma.

The principal constituent of Burmese lacquer, or "thitsi" is an oleo-resin obtained from the "Black Varnish Tree" (Melanorrhoe Usitata, Wallich) a deciduous species, 50 to 60 feet high, which frequents open forests and occurs in Manipur, in Burma from Prome, Pegu and Martaban down to Tennaserim and also in Siam.

To obtain the varnish, "V" shaped incisions are made in the bark of the tree by means of an iron chisel of peculiar shape. The two sloping cuts forming the "V" are about 9 inches in length and 5 inches apart at the upper end, meeting at the point of union at an acute angle. A bamboo collecting cup, about 6 inches in length with a slanting mouth, is driven into the bark of the tree at the base of the incisions, and the exuding sap, a thick, viscid, greyish fluid, is caught in the tube. After about ten days, the exudation from the wound ceases and the contents of the collecting cup are emptied into another vessel. A fresh slice is cut off the triangular piece of bark formed by the two sloping cuts, and the collecting cup is fixed higher up the tree near the new sacrification.

The sap continues to exude for another 10 days, after which time the wound is abandoned. The tapping takes place all over the trunk of the tree and the principal branches ; as many as 40 or 50 scars have been noted on one tree, some being at a height of 30 feet from the ground. The amout of varnish yielded varies considerably ; old trees appear to produce more than young and vigorous specimens.

Skilful Basket Work.

There are several kinds of "thitsi" lacquer work which are produced at different centres, each of which has a peculiar style. The most distinct are the lacquered basket work of Pagan, the Prome gold lacquered ware of Mandalay. and the Manipur varnished ware.

In Pagan ware the foundation of the lacquered article is either basket work or plaited horse hair. The basket work consists of finely divided stems of a bamboo, which are closely woven over a mould. This basket work is so skilfully done that such artlcles as cylindrical boxes, circular trays, and covers, can be afterwards turned on a lathe. To prepare the basket work to receive the lacquer, the meshes are filled with a rough clay, ashes or saw dust, mixed with inferior kinds of "thitsi." Over this a thick coating of raw "thitsi" is applied, which binds the whole together, and the article is then placed in some cool and shady place or in an underground celler to harden.

After 3 or 4 days the lacquer has set, and the article is then placed on the chuck of a bowlathe and ground down with stones of graduated fineness, untill a perfectly smooth surface is obtained. Many coats of lacquer are applied, and after each has hardened a process of rubbing down and polishing is carried out. The finishing coats of lacquer are next applied and these are frequently coloured. If the article is to be further ornamented, it is placed on a lathe and the gloss of the polished surface removed. It is then handed to the engravers, who etch the design to the groundwork by means of a metal style.

Gold and Moulded Lacquer.

In the Prome gold lacquer ware, the early stages of manufacture are similar to those already described for Pagan ware. After a perfectly smooth groundwork has been obtained, the article is re-varnished, and before the "thitsi" has become hard, gold leaf is applied which adheres firmly. The plain gold-lacquered wares are produced in this way. If a design is required, it is painted on the groundwork with a mixture consisting of finely powdered orpiment and gum. Gold or silver leaf is then applied to the whole surface, as in the case of the plain wares, and after this has set the article is washed in water, which removes the orpiment paint and reveals the design in black on a gold or silver ground.

The ornamental moulded lacquer of Mandalay is done over a foundation of basket work or wood, the preparation of a smooth groundwork being carried out on lines similar to those previously described. The moulding material consists of "thitsi" mixed with rice-husk, cow-dung ashes, or finely powdered bone-ash. The ornamental work moulded by hand on a soap-stone slab, is transferred, piece by piece, to the surface to be ornamented; finishing touches are given with wooden modelling tools before it is set. A coating of "thitsi" is then applied all over (no other fixing being required) and the article is placed in a moist place to harden.

Nature Imitation Art.

This industry is carried on at Channapatna and it consists in preparing wooden models of fruits, vegetables, leaves and animals, with their proper colours and shades. As a subject of instruction in an industrial school, it is eminently suited to develop careful and close observation, accurate representation of form, symmetry and proportion and refined judgment of colours, shades and colour-blending.

Attempts are being made to prepare Botanical and Physiological models.

Preparation and sale of paper flowers offer employment to a few local people of Bangalore. Bunches of flowers with leaves are also prepared out of thin cloth, variously tinted and finely stretched on a delicate framework of thin metal wires. **Paper flower.**

CHAPTER XI.

JAGGERY.

Chief areas under cane.

During the decade ended 1910-11 the area under sugar cane in the whole State contracted but slightly from 41,155 acres to 40,510 acres. Considered by districts Kolar with 15,603 acres, topped the list in 1900-01, with Shimoga 6,738, Hassan 5,958, Mysore 4,389 and Bangalore 4,139 following in order.

Ten years later, that is, during 1910-11, Hassan became the greatest producer 10,728, most of the increase having taken place in Channarayapatna, while Kolar has had a considerable reduction in the area under cane, most of this decrease being due to a large contraction in the area in the Srinivaspur taluk.

Principal varieties of cane.

There are three chief varieties of sugarcane, grown largely in the Mysore State, *viz.*, *patapati*, *cheni*, and *rastale*.

The *patapati* and *rastale* are grown largely in the Kolar, Bangalore and Mysore districts, while the variety known as *cheni* or *marakabbu* is grown extensively in parts of the Tumkur, Mysore and Hassan districts.

Quantity of juice.

An extract is given below showing the results of experiments conducted by the Agricultural Department and on the yield of jaggery from *patapati*. The maximum quantity of juice available from that cane is ascertained to be 90 per cent of its weight, the quantity actually milled varying according to the type of mill used. For example, *patapati-cane* milled from a 3 roller mill prepared locally by Messrs. Rickie & Co., is found to mill 65 per cent of juice, while Nahan Mills give 70 per cent and power mill worked by Mr. Krishnaiengar of Uragahalli yields 75 per cent, all on weight of cane.

Yield from various mills.

On an average, one acre of *patapati* yields 20 tons of cane, which ought to yield, if all the juice were extracted, about 288 maunds of jaggery. All the figures of yield are from 3 roller iron mills and are ascertained to be 208 local maunds in the case of Rickie Mills, 224 by Nahan Mills and 240 by power mills, the first in 160 hours, the second in 120 hours and the last in 20 hours. The advantages of having power mills are thus clear. There is an increase in the yield by about 32 maunds yielding about Rs. 50 more and there is considerable saving in time by about 140 hours for crushing cane from 1 acre, that is the time required by a power mill is only one-eighth of that required by a bullock-worked mill.

A tabular statement is subjoined showing the total solids, sucrose and glucose present in the several varieties of the cane. This statement together with a graphical representation was published in the Mysore Exhibition of 1912, by the Agricultural Department.

Name of cane	Total solids	Sucrose	Glucose
Vallay Coimbatore seed	18·6	17·8	0·6
Ashy Mauritius	21·8	21·2	0·2
Patapati, striped cane local, Bangalore and Mysore	21·6	21·2	0·4
Mauritius, striped	21·0	20·2	0·4
White *Rastal*, local	20·6	20·0	0·6
White Mauritius	20·6	19·0	0·6
Purple Mauritius	20·0	19·0	0·8
Chikka Rastale	19·0	18·2	0·4
Cheni Cane	18·6	17·0	1·0

From enquiries made at different centres of cane in the State, it is gathered that, on an average, weight of *patapati* cane from one acre varies from 25 to 30 tons, the quantity of juice milled is about $\frac{2}{7}$ths of the weight of the cane and the weight of jaggery produced is about $\frac{3}{7}$ths of this again or about $\frac{4}{19}$ths of the weight of cane, that is 2 to 2½ tons.

Milling charges.

In the case of the *patapati*, the charges for milling vary from 2 annas per local maund at Manchenahalli, Goribidnur taluk to about 4 annas at Dodballapur and Chikmagalur. At Shikarpur and Honnali the rates are higher and vary from five to six annas per local maund and this is perhaps due to the scarcity of labour and to the inefficiency of that which is available. In the case of the power-worked mill at Agara and Kundalahalli, Bangalore taluk, the rates vary from 4 annas 9 pies to 6 annas according as interest is not or is charged on the capital outlay on plant and buildings.

At the village of Manchenhalli, Goribidnur taluk, the owners of cane are all ryots. There are about 150 acres under cane in that village and the cane from the whole area is cut and milled in about 40 days, twenty mills being used in all and the ryots combining to cut the cane, crush it and to boil the juice. The cost of milling works to about Re. 0-2-4 per maund. They work continuously and in turns all through the 24 hours, thus boiling out more than 50 maunds per day.

The cheni cane.

The *cheni* cane grown in the Tumkur, Mysore and Hassan districts is very hard to crush or mill and is consequently free from the ravages of jackals and other destroyers of any kind. This is one advantage in favour of the general cultivation of this cane in these areas. Another and more important advantage is that it withstands shortage of water better than the other varieties and the cost of cultivation is comparatively small. Moreover, it can stand for a couple of months, after the ripening period of 15 months and lastly the yield of jaggery in proportion to the juice is greater than in the case of *patapati*. For these reasons, it is grown in small holdings by the poorer classes of people.

Condition of cultivation.

At Kunigal, Mayasandra and other areas where *cheni* is cultivated, the owners of cane fields are absentee land-holders and they are either merchants or Brahmins or they are some times very poor with no capital to work with and they borrow money and invest it on cane cultivation and are all dependent upon others for getting their cane milled. Local labour is dear and inefficient, besides being scarce. The cultivating ryots are poor, they cannot cultivate even their small holding for want of capital. They do not combine and work and they do not wish to lose their sleep at night. The milling work has therefore to be done by other agency. Sets of eleven men with mill and pans as well as buffaloes obtain contracts from cane growers, cut the cane, boil the juice and prepare jaggery. These contractors are inefficient and do not work hard nor work their buffaloes fully and consequently the cost of milling is high. It is precisely in these areas that a power mill would be eagerly welcomed and would be really a god-send. This fact was brought prominently to the notice of the Committee for Industries and Commerce and a power mill has been erected at Kunigal. With the advent of the mill like this, the area under cultivation of cane will expand to a very considerable extent, inasmuch as the cost of cultivation is comparatively small, in the case of *cheni*.

Yield of jaggery in parts of the Province.

The rate of yield of jaggery from the local varieties of cane are found to vary, very considerably, in the different parts of the State, the maximum being from 350 to 450 maunds, in Mr. N. Krishna Iyengar's cane plantation at Urgahalli, in the Bangalore district. Here he uses power mills to crush the cane and has adopted all the precautions necessary to get the maximum yield. In other parts, where

iron rollers are used instead of the old wooden ones and are worked by bullock dower, the yield is about 300 maunds of 24 lbs. each, from an acre of cane. Taken by districts, the yield is least in the Chitaldrug district from 20 to 25 maunds, while Shimoga shows a range of 40 to 70 maunds, with an average of 50. The lowest yield is 10 maunds at Koppa in the Kadur district and at Belur in the Hassan district.

In the case of the Mysore district, with an average of 115, the cane grown round about Seringapatam yields only 50 maunds* notwithstanding all its water facilities and this is a point worthy of investigation, as yields of jaggery from sugar cane in the other taluks of the Mysore district are as follows :—

	Maunds.
Mysore	240
T.-Narsipur	200
Chamarajnagar	150
Mandya	225
Nanjangud	100

Mysore State produced 7·47 lakhs of Bengal maunds of jaggery in five years, beginning with 1900-01, 10·54 during the next quinquennial period and 9·7 in the last.

The Goribidnur Sugar Refinery.

Goribidnur Sugar Refinery was established in 1893 by the Arbuthnot Industrials, Limited. It is reported that the factory was doing good business before the abolition of the counterveiling duty on foreign bounty-fed cheap sugar and that subsequently the heavy import of that sugar owing to the removal of that duty affected its working. The proceeds from the sale of the molasses contributed materially to the profits, so long as it was under the ownership of the late Arbuthnot & Co., who were also the Abkari Contractors to the Government Distillery at Bangalore.

It is now working partially every year, according to the conditions of the sugar market and the disposal of the molasses.

The average quantity of palmyra jaggery consumed annually as judged by the quantity of consumption for the last five years 1907-08 to 1911-12 was 8,800 candies of 500 lbs. each or 52,800 Bengal maunds and that of cane jaggery 1,050 candies or 6,300 Bengal maunds and the average annual output of refined sugar was 6,300 candies or 37,000 Bengal maunds. This production distributed to the whole population of 1911 yields an annual average of about half a pound per head, as against the 12 to 13 lbs. of jaggery and sugar consumed by every person in the State.

The quantity of molasses produced will be about 36 per cent of the palmyra and cane jaggery consumed.

The supply of palmyra jaggery is all from Palghat, Erode, Tinnevelly, Tuticorin and Nidadavole and that of cane jaggery from Tiptur, Maddur, Channapatna, Bangalore, Dodballapur and Goribidnur.

Refined sugar is sold at Goribidnur at rates varying between Rs. 5 to Rs. 6 per Bengal maund according to fluctuations in the market and it is also sent to Cochin, Salem, Champion Reefs, Bangalore, Hindupur, etc.

Dr. Lehmann has shown that the introduction of cast iron roller mills in place of those of wood, increased the yield of juice from 60 per cent to 80 per cent of

* Agricultural Statistics published by Government.

the total juice that is, by 33 per cent and this, by itself, is sufficient to account for the increase noticed in the total production of jaggery in the State.

Nearly one-third of the total yield of jaggery in the State falls to the share of the Hassan district and 24 per cent to that of Kolar. The districts of Bangalore, Tumkur, Mysore and Shimoga make up another 33 per cent and the balance being shared between Kadur and Chitaldrug.

A comparison.

Fifteen millions of tons represent the average annual world's production of sugar for a total population of 15 millions of people, or 1 ton for every 100 persons, that is, about 2½ tolas per man per day. If jaggery be taken for sugar, weight by weight, and if the above average of world's annual production (for 3 years, 1908-09, 1909-10 and 1910-11) be assumed for Mysore, the State ought to produce about 42·75 lakhs of maunds of jaggery for a population of 58·06 lakhs in 1910-11, to be in line with the whole world, as regards the production of sugar. And it is curious to find that the total yield, as estimated above, is about 34 lakhs of maunds of jaggery and refined sugar or less than the calculated figure by only 9 lakhs. So, Mysore has contributed to the sugar production of the world in 1910-11 a quantity almost proportionate to her population. But Mysore should not be merely satisfied by contributing her proportionate share of the world's contribution of sugar and it would not be so if improved and up-to-date methods are adopted all round in the selection of seed, the cultivation of cane, methods of irrigation and methods of crushing and boiling.

The future of the Jaggery Industry in the State.

The recognition by the people of the greater economy and increase in the output of jaggery by replacing wooden mills for crushing cane by iron rollers created a great demand for such iron rollers. The 7,000 and odd sets of such required for the 40,000 and odd acres under cane, at the rate of 6 acres per mill per season, acted as an incentive to their manufacture locally and capitalists were not wanting to start a foundry for the purpose. Kolar district was the most important cane producing area in the State at the time and a few enterprising merchants of Chickballapur started a foundry at that place with a modest capital of 4,000 rupees, since increased to Rs. 30,000, in the course of about 15 years. They prepared, according to their accounts, about 5,400 of such rollers from 10″×7″ to 8″×7″ and sold them at rates varying from Rs. 150 to Rs. 80 respectively per set. A similar foundry on a small scale was started at Birasandra at about the same time and another at Goribidnur. These foundries had also set up machinery to groove the rollers after planing them, subsequent to casting. Several smaller establishments were started in the various sugar cane areas of the Province, as at Channarayapatna, Seringapatam, Sidlaghatta, Chintamani and Goribidnur, for preparing and grooving the rollers worn out by use. A time came when the local manufacturers of the iron rollers were ousted out of the field by the importation of a large number of cheaper and more efficient sets of rollers from Madras, Bombay and Calcutta and as a result, the local foundries had to cease work in that line. They then took to importing rollers, grooving them, fitting in axles and to generally repairing the worn out ones. This work is being done even now at the various establishments. The great number of rollers required have been and are being bought by merchants and stocked, for being rented out at the milling season, at rates varying from Re. 0-12-0 to Re, 1-4-0 per day for one set of three rollers, with two pans for boiling juice. The boiling pans of sheet iron were also being prepared in these foundries, till they were superseded by those imported from Madras at lower rates.

A time has now arrived for the next stage of operation, *viz*., replacing the bullock-worked mill by power mills.

This stage reached now is likely to still further enhance the economy of working, as well as the amount of production. Active steps now being taken by Mr. Chatterton, Director of Industries and Commerce, to demonstrate the immense superiority of power-worked mill over that worked by bullocks, are certain to stimulate an expansion of the area under cultivation of cane in the State and to add materially to the productive value per acre besides. Three installations now being established will serve as centres of valuable object lessons and of diffusion of valuable intelligence on the subject. Although three such installations have been established several years ago by private individuals and have been working since, with another set up recently, they have not served the purpose of acting as such centres of demonstration and of diffusion of valuable knowledge, merely for want of pursuasive agency connected with each such installation. Such an agency is now available in the form of special officers of the requisite training who are now to work these installations under the directions of Mr. Chatterton. It would not, therefore, be long before the growers of cane over large areas would bestir themselves and set up installations of their own to economise labour and time, and obtain greater returns from their cane fields. But such persons cannot be many in the whole State. The real object of the experimental demonstrative efforts would not be achieved by a few already prosperous ryots adopting improved methods and appliances. Encouraged by these monetary returns a few merchants would no doubt come forward sooner or later and start such sugarcane mills to crush the cane and boil the juice into jaggery for hire. This would, no doubt, benefit a greater section of the cane growing ryots than in the previous case but a much greater number would still be left without benefitting by such improved methods and the final stage of the jaggery industry would have been reached when the individual growers of cane of small holdings, less than an acre each would co-operate and establish power mills in suitable centres, whether by finding money by themselves or by raising loans from Government or merchants, on the joint security of the co-operators.

But a note of warning has to be struck that the jaggery industry must sooner or later dwindle down and practically die out and it may be that this undesirable state of affairs happens within a generation or so. The special liking on the part of the ryot population both in the Mysore State and outside in favour of jaggery, has been the main prop to the whole industry. The presence of albuminoids in the jaggery acts as a nutrient matter and this is perhaps also a point in its favour, although this point is very likely unknown to the consumer himself. A serious blow will, however, be given to the industry in course of time by a likely change in the tastes of the ryot population in favour of the cleaner form of the sweet principle extracted from cane, *viz*,, sugar. The infiltration into the minds of the ryot population of ideas of greater cleanliness and decency, so intimately associated with the spread of western civilisation might bring about the change of tastes and this will be starting point of the decline of the jaggery industry as it exists now. This statement need not alarm the enterprising capitalists and others who have already set up such power mills; neither those who are contemplating the establishment of such mills with a view to earning profits by hiring them out. The radical change in the tastes of the ryot population from one of special favour to the other extreme will be wrought only slowly, and the change apprehended might not take place within a generation or more, perhaps. The power mill establishments

already in existence or which are about to be established will have earned more than the capital costs of such installations by that time.

Other sources likely to reduce the area under cane cultivation, as it is practised now, will be based on considerations of economy. The imported refined sugar has been falling in price owing to the abolition of the counterveiling duty and if this continues to do, lessening the difference in price between sugar and jaggery, then the general population will favour sugar.

Increase in the cost of cultivation and of manuring due to exhaustion of soils will also effect the jaggery industry in an adverse manner.

Manufacture of sugar direct from cane means increased production and large holdings favouring the application of large capital for machinery and plantt These are serious difficulties and until they can be solved, the question does no. admit of any easy and practical solution.

CHAPTER XII.

COFFEE AND TOBACCO.

Coffee.

Coffee was introduced into India about two centuries ago, probably by a Mahomedan pilgrim named Bababuddan. Between the years 1820 and 1830 A.D., the first settlement of European planters took place in the Bababuddan Hills of Mysore and in the neighbourhood of Manjarabad.

Mysore area under coffee.

Of the various coffee producing areas in South India, the Mysore State has the largest extent. In 1896, the total area under coffee in South India was 3,10,450 acres, of which 1,39,010 acres or 45 per cent, belonged to Mysore.

Decline.

The total coffee area in Mysore has fallen from 1,39,010 acres in 1896 to about 1,04,652 in 1910-11, due very probably to two causes, *viz.*, fall in the price of coffee and the increasing difficulty in getting labour with the general increase in the wages as well.

I have not been able to get complete information regarding the distribution of the estates, their number, area, etc. The Indian Coffee Planters in meeting assembled in Saklespur and Chikmagalur made me understand that, roughly, the area under coffee under European management would be about one-third of the whole.

According to Mr. R. H. Elliot in his book entitled 'Gold Sport and Coffee Planting in Mysore,' the native plantations in the State amounted to 27,118 in number in 1890-91, with an area of about 96,814 acres. But many of the so called plantations consisted of small patches of coffee.

Coffee districts.

Coffee is cultivated in the Mysore State in the ever green belt of forest regions bordering the Western Ghats as well as on the Bababudan Hills. Most of the area under coffee is in the Kadur district, Hassan following next, with only a few acres in the Mysore district. It might be stated that there is no coffee cultivation in the Shimoga district, although the conditions of rain fall, temperature and forest are similar to those in Kadur and Hassan, especially in the ever green belt of that district. It appears that the coffee plant does not thrive therein as the soil is highly lateritic, porous and incapable of retaining moisture near the surface to support the growth of the plant.

The European Planters have large capitals of their own, while the Indians borrow from the local money lenders and from Messrs. Morgan & Co., Mangalore.

Some planting data yield

From the statement extracted from the Report and published on page 88 several sets of general figures can be obtained concerning the coffee planting industry. The value of coffee estates was reckoned at Rs. 633 per acre, the number of coolies at one per acre and that of maistries at one for every 25 coolies. The actual annual expenses were set down at about Rs. 110 per acre, made up of Rs. 53 towards the wages of coolies, Rs. 7 remuneration to maistry and Rs. 50 for manure and other expenses.

The European Planter raises an average quantity of 3 cwts. per acre as against 1·6 cwts. (Koppa) and 2¼ (Chikmagalur) in the case of the Indian.

Report of the South Indian Planters' Enquiry Committee, 1896, (page 6).

In 1895, the production of coffee was estimated at 16,796,016 lbs; while it was 11,87,473 lbs., 10 years later, from 138,670 and 101,313 acres respectively or 121 and 117 lbs. per acre, which gives an average of about 119 lbs. or $1\frac{1}{16}$ cwt.

Export.

The latest figures under Trade and Navigation of British India give the following export figures for three years *viz.*, 232,645 cwts. for 1909-10, 272,249 for 1910-11 and 241,085 for 1911-12. If the area under coffee in the Mysore State be assumed to continue to be about 45 per cent of the total area in the whole of Southern India, the figures giving proportionate quantities of export from Mysore for the three years would be 104,690, 122,512 and 108,488 cwts. respectively.

But, as a matter of fact, there has been a fall in the area under coffee in the Madras Presidency, outside Mysore, and the proportion of the Mysore area to the total in Southern India has increased considerably. Consequently the quantities and values of the probable Mysore share of export would be greater, the local consumption of Mysore coffee being comparatively small.

Value of the Mysore share of export.

The value of the total Indian export of coffee during the three years ended 1911-12 was Rs. 10,964,000, 13,316,000 and 13,462,000 for all the plantations in South India. The average value of the coffee production of the State might be set down at about Rs. 56 lakhs in round numbers, on the assumption that Mysore produces about 45 per cent of the total production for all India. But it ought to be much more, for reasons stated above.

Export by rail and by road.

Nearly one-third of the coffee exports from India is sent to the United Kingdom and another one-third to France and the remainder to Australia, Ceylon and other places. Export *via* Bombay is shewn to be worth about Rs. 1,82,093 for 1910-11 and Rs. 3,85,000 for 1911-12, although the actual quantities of export from Birur and Tarikere alone would be worth Rs. 10,00,000 for the 23,371 maunds railed, indicating that much of the coffee so railed is probably shipped *via* Marmagoa harbour. The main bulk of Mysore coffee is carted by road to Mangalore *via* Agumbe, Marnahalli and other Ghats. The quantity sent through Marnahalli in 1910-11 was 1,102 cart loads, and that in 1911-12 was 1,428 cart loads, while that through Agumbe in 1908 was represented by 1,717 cart loads.

Labour force.

It was already stated that, according to the Report of the South Indian Planters' Enquiry Committee, a coffee plantation could be efficiently cultivated, with a labour supply of one cooly for every acre under cultivation and one maistry for every 25 coolies. This was the practice in 1896. At present, one cooly for two acres is considered enough by several planters. A reference to the Statistics of Industries published in volume II of the latest Census Report shows that the total number of persons employed in coffee estates was 19,127 for Kadur plantations and nearly 6,912 for those in the Hassan district, making up a total of 260,030 or nearly $\frac{1}{4}$th of the number of acres under coffee or $\frac{1}{2}$ of what the coffee planters state they require. More than 80 per cent of the labour force required by the coffee planter is brought from South Canara, North Arcot, Vellore, etc., and the remaining 20 per cent from parts of the Mysore and Hassan districts.

Increasing demand and decreasing supply.

Demand for labour is continuously on the increase, but the supply is decreasing and will do so still more in the near future. Many of the local labourers have settled down in the villages, having been benefitted by their earnings, and those of them who are destitute, prefer to go out of Mysore as they would get more wages up to annas 6 per day. As a matter of fact, nearly 8,000 people went to Ceylon since 1901. The Kannambadi project is also an attraction nearer home. The South Canara cooly also finds a more remunerative source of employment nearer

home, in fisheries, called *Maribale* recently started in several places in that district, *viz.*, at Malpey, Mangalore, Hangarkatte, Gangwalli and Kapi. More than 2,000 coolies have already been employed in the several fisheries at these places. There is another cause which is operating against the influx of Canara cooly labour into the coffee plantations and areca gardens of the *malnad* districts. The tea and rubber plantations of Travancore, Ceylon, Pulneys, Annamalais and Straits are attracting a number of them, as the wages are higher, *viz.*, annas 6.

Other fields for labourers.

There is still another field of employment likely to spring up soon, when the time comes for tapping rubber in the various rubber estates referred to.

The people of *malnad* have taken to introducing new varieties of crops such as tobacco, sweet root, etc., and the *passari* contractors of the Forest Department also require a number of labourers, besides the P. W. D. Department.

Systems of labour recruiting

There are two systems by which the coffee planters get their supply of labour, one of which applies to those that are brought from South Canara and the other to those from parts of Mysore State, North Arcot and other areas. The South Canara labour is either supplied by cooly contractors called *Shervagars* or labourers themselves come in gangs and get themselves engaged. The *Shervagar* is usually advanced money without interest to the extent of Rs. 200 by planters requiring labour. He is to supply cooly to the extent required and get commission of Rs. 10 on every Rs. 100 worth of work turned out by the coolies. But the *Shervagars* themselves pay the labourers at one *varaha* or Rs. 4 for every 24 coolies, irrespective of male, female or boys and supply them, besides, rice and condiments. It may be stated here that 12 years ago 40 persons were supplied for the same amount, 5 years ago only 32 persons and now 24 are supplied. In some parts of the Nagar taluk coolies are not available at even 18 persons for one *varaha*. The rates of cooly in these parts works to about Re. 0-3-3, 0-3-10 and 0-5-6 respectively, during these years. The *Shervagars* or *Maistries* very often fail to execute their contract and the money advanced, if realised at all, is done so with great difficulty. I have heard of several cases where these cooly contractors made themselves scarce.

The South Canara coolies.

Other demands for these coolies.

It may be remarked here that the demand for the South Canara coolies is not confined to the coffee industry. The areca and paddy growers of the *malnad* especially those of the taluks of Mudgere, Koppa, Thirthahalli, Sagar and Nagar besides some in Saklespur require about 3½ lakhs of persons in all, at one cooly per acre under paddy and 2 for every acre under areca. The paddy crop by itself requires about 2,81,909 persons as the area under paddy in the ever green belt of *malnad* amounts to that figure.

The gangs of coolies who come from South Canara by themselves without the help of *Shervagars* or *Maistries* also get their wages at the rates specified above.

Coolies from other Madras districts.

The coolies imported from parts of the Madras Presidency are paid at annas 4 for men and 2 annas 8 pies for women. Here again, the *Shervagar* is remunerated at Rs. 10 for every Rs. 100 worth of work turned out by the coolies and he likewise receives money advances without interest.

Future difficulties labour.

The coffee planter now gets only one man for his industry where 4 men are necessary and his difficulties are just beginning. The higher wages of 6 annas per day or Rs. 11 per month offered to South Canara people at other places in connection with *Maribale* or fishing and similar wages paid to them by the different rubber and tea planters of Ceylon, Travancore and Straits Settlements are just

beginning to react on the local coffee industry, reducing the margin of profits to the coffee grower.

System of advances.

The system of advancing money to the coolies had for its object the relief of the labourer from his indebtedness to the gowda, and the cooly before he leaves his house for work in distant tracts wishes to leave some money behind for use when he is away. Advance is also necessary for the consideration of the guarantee as to the time and the number of coolies employed. Besides, it serves as an earnest money and advances connot be replaced by high wages.*

Nearly all the coolies are indebted to the money lender for money advanced either for marriages or for ceremonies or for purchase of cloths, etc., at enormous rates of interest reaching up to 25 per cent and which rate is one that can hardly be said to be uncommon. The money lender is said to exercise all his ingenuity to prevent the complete discharge of bonds.

Capital for coffee planting.

As remarked already, many of the European planters are supplied with the required amount of capital by joint stock companies. They export all their coffee to England. Money required for labour and for agricultural purposes connected with the industry flows very easily in their case, whereas about 87 per cent of the local native coffee planters are perpetually in debt, to the extent of about 75 per cent of the value of the out turn of coffee.

The Indian coffee planters borrow money from Messrs Pierce Leslie & Co., or from the local Marvadies or merchants at 12 or 13 per cent interest. Messrs Morgan & Co., Mangalore, charge 9 per cent on the money actually paid, together with about 2½ per cent commission on the sale value of coffee in London, or about 11 or 12 per cent interest in all. Otherwise if coffee is to be sold in Mangalore, the growers have to pay about 9 per cent, apart from 4 per cent commission on the sale value or about 13 per cent.

Enactments suggested to enforce labour contracts.

Almost every planter whom I met has urged the need for some enactments in Mysore to enforce labour contracts, corresponding to the Indian Act XIII of 1859; of Section 492 Indian Penal Code and Section 12 of Madras Act V of 1866. The question is exhaustively discussed in the report of South India Planters' Enquiry Committee.

Coffee industry stimulates others and trade.

The coffee planting industry stimulates the development of other industries and trade in several directions. Manure is required in considerable quantities along with lime, a large supply of mats and baskets at one and two respectively for every acre under coffee, a great number of cheap *kamblie* for the ware of the coolies working under them, besides agricultural implements, gunny bags, ropes, etc.

Manure.

As regards manure, the quantity required varies differently with different planters. Farm yard manure cannot be got in plenty and fertilisers are supplied. On an average, 4 oz. of fertilisers are required per plant *i.e.*, about 4 cwt. per acre, the plants being 5' apart. At this rate, not less than 20,000 tons of artificial fertilisers alone will be needed by the lakh and odd acres under coffee cultivation in the whole State. This very large need of the coffee planters is supplied either by some of the more enterprising and flourishing planters getting them prepared in their own estates or their supply is obtained from Mangalore by road or from Hubli, Ranipet, Coimbatore and other places by rail and road. The fertilisers that are most used are admixtured with bone meal and oil cake in the proportion of 1 of bone meal and 2 of oil cake. Hundreds of cart-loads of these fertilisers are supplied by Messrs Pierce Leslie & Co., of Mangalore. This firm buy bone at Bangalore and

*Report of the South India Planters' Enquiry Committee.

take it by rail all the way to the West Coast and send the fertilisers by road again into the coffee estates of the Mysore State, in spite of the heavy charges of cartage of Rs. 6 to Rs. 8 per cart. If the coffee planters get all their bone supply from Bangalore alone and prepare their fertilisers, they could save their railway freight to and fro.

Messrs Petrie Hay & Co., of Hunsur, have been working their manure mill for some years past and their total out put is about 600 tons every year, but they are too far off from the coffee zones of the Hassan and Kadur districts, their main market being the estates in Coorg.

Baskets and mats required.

For every acre under coffee two baskets and one mat are required and the requirements of the planters under this head are very considerable and there is a great room for a large population of workers in mats and baskets settling down near the estates.

Agricultural implements.

Another item that is required is in the form of agricultural implements which are estimated to amount to about a lack of rupees per year or about Re. 1 per acre under coffee.

Ropes.

A considerable quantity of cocoanut coir is wasted at Tiptur which might be utilised in the preparation of second or even third quality of ropes, etc.

Kamblies.

Every cooly in the *malnad* requires at least one *kambli* for a year valued at about 10 to 12 annas each.

The following tabular statement extracted from the "Report of the South of India Planters' Enquiry Committee" furnishes some useful data, though old, connected with the coffee planting industry in Southern India.

Tract	Total cultivated area in acres	Total value of estates	Number of Maistries	Number of coolies employed	Annual payment to Maistries	Annual payment to coolies	Total annual working expenses
		Rs.			Rs.	Rs.	Rs.
Madras Presidency ...	79,653	5,04,20,349	3,186	79,653	6,13,328	42,05,678	87,61,830
Coorg ...	73,880	4,67,66,040	2,955	73,880	5,68,874	39,00,850	81,26,772
Mysore State ...	1,39,010	8,79,93,330	5,560	1,39,010	10,70,377	73,39,728	1,52,91,100
Travancore State ...	14,497	91,76,601	580	14,497	1,11,627	7,65,442	15,94,670
Cochin State ...	3,417	21,62,961	137	3,417	26,311	1,80,417	3,75,870
Total ...	3,10,457	19,65,19,281	12,418	3,10,457	23,90,517	1,63,92,115	3,41,50,242

Tobacco.

There are about 15,000 acres under tobacco in the whole State.

Local methods of curing tobacco.

In an acre of tobacco at Hunsur, there are 1,000 to 1,250 plants with a total yield from 4 to 8 maunds of 44 seers of 26 tolas each. Straw is spread on the floor of a closed room to a depth of six inches and leaves of tobacco laid thereon side by side, to form one layer. The next layer is made up of leaves arranged with their lengths across those of the leaves in the layer below. The leaves are packed in such layers to a height of 3' to 4' and then water sprinkled with *tolasi leaves*. Top and sides are then covered by date mats and the whole kept in position, for a time. After this the leaves are taken out one by one, the whole

process being repeated 3 to 4 times in a fortnight. If the curing be completed, the leaves yield a good smell.

Quality and prices

The leaves from Bettadapur, Majikere and Revandore are considered the best. There are several other localities in Yedatore where tobacco is grown and cured in the manner described above. Stock of leaves is bought by the merchants from Bangalore, Harihar and Madras, at prices ranging from Rs. 3 to Rs. 10, and at an average of Rs. 5 per maund. The stems are sold at 8 to 12 bundles per rupee, one bundle weighing about a viss.

A second crop is gathered in two months from the stumps left after the first cutting and it is powdered and sold in exchange for paddy at Coorg and other places, at 4 to 6 seers of paddy per seer of tobacco powder.

Local tobacco not used in cigarette factories.

The Cigarette Factories at Bowringpet and Bangalore do not utilise the tobacco grown in Hunsur, Yedatore and in other parts of Mysore, inasmuch as it is too strong and consequently of higher value. Cheaper form of tobacco is bought from outside the State.

Cigarette factories.

There are two factories in Bowringpet. The South India Tobacco Manufacturing Company was started in 1911 with a capital of about Rs. 50,000 and as an individual concern, owned by the members of a single family, while another known as the Star Tobacco Manufacturing Company was started in 1905 with a capital of about Rs. 75,000 for plant and buildings. An oil engine of 9 H. P., is used in the first and a steam engine of 7 H. P., together with an oil engine of 4 H. P. in the second. About 100 persons are engaged in both the factories, some on monthly payments and others on daily wages. About 25,000 maunds of tobacco is reported to be consumed between the two factories, valued at about a lakh of rupees per year.

Tobacco supply from outside.

The supply of tobacco from Bettadapura and other places in the State is not suited for these factories, as it is too strong and the factories get their supplies of the required quality from Guntur and Bezvada, also from Salem, etc., and at cheaper rates.

CHAPTER XIII.

OIL SEEDS AND OILS.

Oil Seeds.

Various kinds.

The vegetable seeds from which oil is extracted in Mysore fall under two main classes, *viz.*, those that are cultivated such as the gingely, castor, earthnuts, *Hutchellu*, rape, mustard, etc., and those gathered from trees like the *Honge or Pongamia glabra*, *Bevu* or *Melia azadirachta* and *Ippey* or *Bassia latifolia*. Some forest trees like *Dhupadamara* or *Vateria indica*, *Vateria malabarica*, *Garcinia purpurea* and *garcinia pictoria* also yield seeds from which some kind of vegetable fat is prepared on a small scale here and there in the *malnad* forests. For a short note on these last forest oil seeds, see Part I, pages 51 and 52.

Agricultural seeds.

Out of the several cultivated oil seeds, only the first four are of importance to Mysore, *viz.*, gingely, castor, *hutchellu* and earthnuts.

No information is available in the Agricultural Statistics regarding the quantities of outturn of any of these seeds.

That annual publication gives merely the areas under cultivation for gingely and for all the other oil seeds put together.

Detailed information is, however, available in the Revenue Serial No. 20, maintained in the taluks and collection of this information might be undertaken when a scheme of detailed enquiry is organised.

A rough idea, however, might be obtained of the average outturn of oil seeds, on the basis of the average yield published for all India.

Production and consumption.

Assuming that the area under groundnuts is comparatively small, though the cultivation of this crop is continually on the increase, the average area of about 2·8 lakhs of acres under oil seeds in Mysore would yield about 11 lakhs of Bengal maunds annually and the average annual export from the State is about 4 lakhs of Bengal maunds, or about 36 per cent of total production, the remainder increased by import representing the local consumption. See page 28, Part III.

For an account of the internal trade in oil seeds, see pages 46 and 47, Part III.

Oils.

Country oil mills.

The work of extracting oil from oil seeds is being done mostly by the indigenous wooden or stone oil mills, called *ghanas*, worked by bullocks, and to a smaller extent by power mills, driven by steam or electricity and by screw presses worked by manual labour.

There were 3,572 *ghanas* about twenty years ago and the number has fallen to 2,796, last year, owing partly to the introduction of power oil mills and partly perhaps to the increasing export of oil seeds.

The stone *ghanas* are in use mainly in parts of the Kolar district. The *ghanas* mill all oil seeds besides pieces of *kopra* at Tiptur, while the power mills crush castor seeds mainly with some groundnut and gingely.

On an average, about fifty measuring seers or about four local maunds of seed are crushed in one *ghana* per day, with an average yield of one seer by weight of oil for one measuring seer of about two pounds *i.e.*, 30 per cent of the weight of the seed used. This is very low, since the yield from power mills is over 40 per cent.

Screw presses and power oil mills.

There are four screw presses at Bangalore and Arsikere, used solely in extracting oil from castor seeds and only two power mills, one in Mysore and another in Bangalore.

One enterprising merchant of Bangalore has introduced two Calcatt *ghanas* or iron rotary mills, worked by electric power and both groundnut and gingely seeds are crushed.

Full data are not available for estimating the quantity of production of the various kinds of oil in the State.

The bulk of the seed-oil produced in the Province is from the local *ghanas*.

Their capacities vary and some are of stone, while most of them are of wood, with differences in the rate of yield of oil and in the quantity of production.

Moreover, various seeds are used, *viz.*, gingely, *hutchellu*, hongey, ippey groundnut and even castor, as at Kengeri near Bangalore, the same mill using the different seeds in different parts of the year. For an account of trade in oils, see pages 28—29, Part III.

It is indeed difficult to attempt a forecast of the future of the oil milling industry in the State.

Old attempts.

Two serious attempts were made in the State at introducing power worked oil mills on a large scale, for crushing oil seeds and both have been shut down.

There are two main difficulties in the way of success of large power worked oil mills.

Some causes.

Firstly, there is a want of any large local demand for oil for industrial purposes, such as in soap manufacture and also for the cake except for castor, for manure and secondly there are several difficulties in the way of export of seed oil.

Even if the difficulties of transport could be got over by arranging for tank waggons in railways and bulk storage in steamers, the foreign protective tariffs on oils render the business of export risky or unprofitable.

Moreover, a doubt has been raised by a prominent European commercial gentleman of Madras, at the Ootacamund Industrial Conference, whether after all, the power worked oil mill is much more economical than the country *ghanas*, worked by bullocks.

A point for consideration.

There is still another factor that has to be allowed for in considering this question, *viz.*, whether, under these circumstances, it is desirable to supplant an important rural industry providing occupation to nearly three thousands of families or about fifteen thousands of persons, with a few power worked oil mills, at a few centres, benefitting only a few capitalists at the expense of several thousands of the rural population.

The point raised is of wider application and would necessitate the discussion of the more general one—*factories* versus *rural industries* and it is not proposed to start the discussion.

A suggestion.

It appears to me, however, that until certain conditions are fulfilled the general introduction of power mills for oils might be deferred and some simpler appliances introduced which would benefit the local *ganigars* and slightly increase their output of oil as well.

The *ganigars* of a few neighbouring villages to be educated to the advantages of co-operative movement and induced to introduce bullock-worked iron *ghanis*.

Some necessary conditions.

The conditions to be fulfilled are mainly two, *viz.*, the developing of schemes for such local industries as would require the use of greater quantities of oil such as soap manufacture, the preparation of lubricating oils, of paints, etc., and finding use for oil cakes, as those from gingely and *hutchellu*, for cattle food.

It should be remembered that, unless a high price is secured for these oil cakes, it does not pay mills to crush gingely or *hutchellu* on a large scale while it pays the country importing these oil seeds to pay high prices for the seeds themselves, as the demand for oil and for cake is very extensive and great there.

Starting of manure mills to utilise the cakes from castor, *hongey* or *bevu*, more extensively than at present, would also help schemes of introducing power worked oil mills from these seeds.

Mahua Flower.

Mahua flower or flower of Bassia Lalifolia or of *Ippey* is being exported from some of the stations between Tiptur and Tumkur to Dharwar, Belgaum and Poona. During 1912, about 6,000 Bengal maunds were despatched and about 2,420 in 1911. I have not been able to obtain any specific or reliable information about the total quantities despatched or their values. From enquiries made at Sira and at other places, I understand that Mahua flower is collected mostly from Magadi, Chikballapur and Kunigal taluks. It was being bought by one Sait of Tiptur at Rs. 3 to 3½ per Bengal maund, from the people who collect. It appears that, for some reason or another, about 10 waggons of the flower despatched to Dharwar were returned and that the Sait sustained a considerable loss.

The yield of spirit from Mahua is said to be about 7·6 gallons per cwt. (Sir George Watt) while the yield from molasses about 5½ and much less from potatoes and barley.

A more systematic collection of the flower might be organised and distillation of Mahua spirit introduced.

Messrs Arcot Narainsawmy Mudaliar and Sons, who were once the Distillery Contractors might be interested in the question after detailed enquiries and investigation are completed.

Kosum seed oil.

The oil from Kosum or seed of *Schleichera trijuga* was recently tested for soap making by a large firm in India and pronounced to be most suitable for the purpose, after having been rectified. It is also used as a hairoil.*

Places suggested for new oil mills.

Merchants of Chellakere inform me that they import jinjili oil into that town to the extent of 750 local maunds per year and that Chitaldrug requires about 1,000 maunds and Hiriyur about 750. There is a large supply of jingili seed cultivated locally and it is estimated to yield about 2,500 maunds of oil.

Chellakere might therefore be chosen as one of the places for a bullock *ghani* for extracting jinjili oil. **Chellakere.**

South of Bangalore, the following stations, *viz.*, Mysore, Chennapatna and French Rocks might be considered as suitable localities for establishing such *ghanis*. Whereas, between Bangalore and Davangere, there are many places, *viz.*, Arsikere, Tumkur, Tiptur and Ajjampur. A place like Ajjampur or Hosdurga might be chosen as the site which would be the centre for all the oil seeds area, while Chennapatna would be the central place for the supply of oil seeds to the south of Bangalore. **Hosdurga. Chennapatna.**

The Amildar of Honnali informed me that there were no oil mills in the whole taluk though the people require oil. They send away to Davangere their oil seeds to the extent of about 1,000 cart loads of 8 pallas per cart. People are anxious to have some oil mills established in this taluk. **Honnali.**

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* Pearson's Commercial Guide to the Economic Forest Products of India.

CHAPTER XIV.

ESSENTIAL OILS AND PERFUMES.

Essential oils are volatile oils which evaporate without decomposition and with little or no residue. They are distinguished by their strong and characteristic odours.

Various sources.

They are mostly of vegetable origin, derived either from flowers like the rose, jasmine, orange or from leaves of herbs like the rosemary, or from *thulasi* (the holy basil, *Ocimum sanctum*) and *Cinnamon* leaves and certain grasses, like the lemon grass of Travancore, the citronnella grass of Ceylon or the rusa grass of Khandesh and Central India. In certain cases, the rinds of fruits also yield an essential oil, as in the case of the orange, and lastly many fruits like the orange and the lemon and seeds like anise, ajwaine, omum and coriander also yield odourous volatile oils. Certain woods like the sandal likewise furnish the perfumer with valuable essential oils.

Methods adopted.

Several methods are adopted to extract essential oils, of which the most important are distillation, expression, maceration in fat and enfleurage or absorption.

Distillation.

The first or distillation is universally adopted in India, a still and condenser being used. Parts of plants containing the oil are boiled with water, whereby the vapour of the oil, released from plant cells, is carried over with the vapour of water, both of which condense in the condenser and are easily separated. Steam is sometimes used directly, instead of boiling water.

At places outside Mysore.

The sandal oil manufacturers in Kanouj in Northern India, at Kangundi bordering the Mysore State and in South Canara adopt this method, as well as those preparing the various grass and seed oils in Ghazipur and Jaunpur in Northern India, Travancore and Ceylon in the South.

In Mysore

The cinnamon oil prepared by the South Canara labourers from the leaves of the plant cinnamomum s.p.,—the Indian Cinnamon, is obtained by distilling the leaves of the plant gathered from the forests of the Mysore State. 127 stills for the manufacture of the oil were in operation during the year 1911-12.

Expression *ecuelle*.

The method of obtaining essential oils by expression consists in applying pressure and this is adopted in only a few cases, as with the orange and the lemon. The fruit is made to revolve in a metal cup lined with spikes called the *ecuelle*. A modification of this method consists in varying the size and form of the *ecuelle*, which is sometimes shaped as a drum which is rotated by mechanical gearing, the fruit being put inside. 100 or more lemons are operated upon at one time.

Maceration.

If steam or electric power be employed to rotate this drum, the production can be increased considerably.

The process of maceration in vegetable tallow or paraffin is specially applicable to extracting the essence from flowers and where it is desirable to avoid the application of heat, as much as possible. The tallow or paraffin is first melted on a water bath and the flowers macerated therein. The perfumed fat is then shaken with alcohol which removes the perfume.

Preparation of pomatums is another method by which vegetable fat or lard is made to absorb as much of the essence as possible by covering layers of fat with flowers and renewing the charge daily, till the fat is sufficiently impregnated with the perfume. **Absorption.**

Some Indian Essential Oils.

According to Mr. David Hooper of the Industrial Section of the Indian Museum, *rusa* grass oil obtained by distilling the *rusa* grass, *Cymbopogen martinii*, originally *Andropogen shoenanthus* is being manufactured in parts of the Khandesh district, Bombay Presidency and also in the Central Provinces and Berars. It is used in making hair oils, in scenting soaps and in perfumery in general. **Rusa grass oil. Its uses.**

Every one of the stills could produce one and a half maunds of oil during the season and the price fetched varies from Rs. 2 to Rs. 4 per pound.

The distillation requires only a moderate amount of skill and a small initial capital and the manufacturer gets a decent return. **Its manufacture, a rural industry for investigation.**

The manufacture is eminently suited to be organised and worked as a rural industry.

The Forest Department might therefore well investigate into the local resources in that grass and publish the information. **Suggestion.**

This oil is distilled from the lemon grass, *Cymbopogen citratus*—occurring abundantly in the Travancore Hills, for about six months in the year. The Malayalis who carry on the business use a copper still with an earthern dome, while the condenser is a copper tube immersed in a tall wooden bucket of water. The stills are moved about from place to place according to the supply of grass and cost from Rs. 200 to Rs. 300. **Lemon grass oil.**

The yield of oil is about a quart for every distillation and its market value is about Rs. 3. This oil is sent from Cochin to New York, Hambugg and London. **Yield and market.**

The resources of the Mysore State in lemon grass would form a useful subject for investigation by the Forest Department. Like the *rusa* grass oil this manufacture is also suited to be worked and organized as a rural industry. **Another possible rural industry.**

It appears that the Travancore oil sells at Rs. 10 per bottle containing 32 oz. and that Rs. 50,000 worth are exported every year.

This oil, distilled from the grass *Cymbopogen nardus* is prepared chiefly in Ceylon, the grass being cultivated on hill slopes. **Citronela oil.**

Manufacture of turpentine oil is a State Industry in Northern India, factories being established at Dehra Dun, Naini Tal, etc. The oil is utilised in the manufacture of paints and varnishes. **Turpentine oil.**

Mysore resources in woods yielding turpentine oil might be ascertained, before the question is considered as to the agency of working. **Mosore resources to be ascertained.**

Other possible perfumery Industries for Mysore.

Flowers like the jasmine and the rose, herbs like the *maruga*, are the raw materials required for some of the oils and *attars*, most highly prized and valued in the European and American markets. They are available in the Mysore State and their production can be increased without the expenditure of much capital, so as to support a number of small manufacturing establishments distributed over the country, especially in the rural parts. **Some raw materials available.**

Flower farming and preparation of perfumes from the flowers produced would thus be an ideal industry, falling well within the scope and means of the poor ryot and of the small capitalist. **Flower farming an ideal industry.**

Rose.

Rural rose farms possible.

Roses grow well in several parts of the State and farms for rose flowers can be started in those parts and stills set up at convenient centres to utilise the flower supply of the surrounding villages, to manufacture otto of roses and rose water. The ryots can grow small quantities in small garden plots and a small capitalist with a still stationed in a hobli or taluk town could prepare the otto or *attar*.

Value of rose farms.

Some idea of the value of rose farms can be gathered from a study of the industries, as worked in parts of Europe, Grasse and Cannes in France producing the finest rose pomade. About 7,000 plants cover an acre and yield 5,000 lbs. of roses. The farms last for 6 to 8 years. The roses are sold to the perfume manufacturers at one to one and a half anna per lb., fetching a gross income ranging from Rs. 300 to Rs. 450 per acre.

Rose water prepared in Punjab. etc.

Rose water is manufactured in the Punjab and Bengal and imports from Persia are large. The Damescena rose or *rosa damascena* forms the raw material from which the people of Gazipore and Jaunpore have been preparing rose water.

Here 100 lbs. of roses are estimated to produce 180 grains *otto* and 100 bottles of rose water.

In Cashmere the rate of yield is different, 500 to 600 lbs. of flowers yielding one ounce of *attar*.

Jasmine, *Jaji*.

Essence of jasmine or *jaji*.

Jasmine (jasminum grandiflorum), the Kanarese *jaji*, is one of the flowers most prized by the perfumer in Europe and in India. Its odour is delicate and sweet and is so peculiar that it cannot be imitated. Its essence is very costly of production and is rare It was once (1862) sold at £9 or 135 rupees per fluid ounce. (Art of Perfumery by Piesse).

What is known as oil of jasmine is a fixed oil impregnated with the aroma of that flower.

Its cultivation in France.

Jasmine is extensively cultivated at Grasse in the South of France. It is stated that 8,000 plants are grown on one acre and yield about 500 lbs. of blossom per year of 40 to 45 days. (Two plants in a garden in Bangalore together yielded nearly two ounces of flowers in one day).

Some statistics.

Hundreds of small cottages with little plots supply the flowers to the perfume manufacturer. Each manufacturing establishment consumes from one to two cwts. of blossoms per day and buys them at an average of 2 shillings per lb., equivalent to about one rupee per seer of 24 tolas.

Income.

According to the Journal of Society of Arts, November 20, 1903, page 19 one acre planted with *jasmine grandflorum* at Grasse is said to yield 250 pounds sterling yearly or Rs. 3,000.

Considerable amount of work will have to be done to reap this rich harvest.

Preparation of jasmine pomade.

The odour from the flowers is obtained from the method of enflourage or absorption. Pure lard is spread on a glass plate or tray and the fresh gathered flowers are sprinkled over the lard and left for a day or so and then removed. The process is repeated during the whole of the jasmine season of about 6 weeks. The grease will have absorbed the odour and it is scraped off, melted at low temperature and strained. The jasmine pomade is now ready.

Three lbs. of flowers yield one of pomade.

The odour of jasmine is removed in another way. The blossoms are spread over cotton cloth steeped in olive oil and the process repeated. The cloth is then squeezed under a press and the oil obtained. **Jasmine oil.**

Extract of jasmine is prepared by treating the pomade or oil with rectified spirits. It is used in preparing several handkerchief perfumes. **Jasmine essence.**

In Turkey, the jasmine plant is utilized in another way and the straight stalks are utilised in the manufacture of pipe tubes. **Jasmine stalk used.**

The brief account given above of the economic value of jasmine cultivation and of extraction of its odour suggests the query whether the industry cannot be introduced extensively in the rural parts of the State, and whether the conditions are favourable. **An enquiry is warranted**

The European perfumer requires it very much, that is there is a great demand for it, being rare. **Demand great.**

Every villager can grow the flower on a small plot, say a gunta or so, and a number of such distributed in several villages will be able to support a manufacturing establishment at convenient centres. The collection of flowers requires the agency of several persons and cultivation of large areas by individuals will perhaps make it difficult of working. Whereas small plots owned by each villager will be easily workable, since the ryot and his family will do the work of collection of the blossoms and of carrying the same to the manufacturer close by. The small plots will further favour intensive cultivation and greater production, enhancing the net yield per gunta. **Villages can grow flowers.**

If everything goes on well the gross profit per gunta would be nearly Rs. 75 per year.

The industry is thus an ideal one for introduction into the rural parts. The general ryot population will be benefited as well as a number of the small capitalists. **An ideal rural industry.**

As the jasmine season is only 40 to 50 days in August and September, the work of collecting the blossoms do not interfere with the ordinary cultivation of field crops. **A good subsidiary occupation.**

Cassie or Kasturi jali.

The famous *cassie* pomade of commerce is prepared from the flowers of the plant *Acacia farnisiana*. This plant is known locally by the name of *kasturi jali*. It grows wild in the open forests of the Chitaldrug and Tumkur districts and perhaps in other parts of the State also. It is also cultivated occasionally by the ryots for the sweet scented flower. **Cassie available in Mysore.**

According to "The art of Perfumery" by Piesse, each tree or plant yields about 2 lbs. of flowers per year and these fetch about 3 to 4 pence per pound, at Cannes in France, *i.e.*, 3 to 4 annas per lb. or, an annual income of 6 to 8 annas per tree. **Yield.**

The tree is propagated from seeds. The seedlings, 2 years old, are transplanted with a space of about 12 feet square for each tree. An income of about Rs. 130 per acre is thus possible.

It appears that as much as £30 to £40 are obtained from one acre of *cassie* plants at Cannes in France.

This is a new field for the Mysore ryot to increase his income. **A new field for the ryot.**

The flowering is successive and this is an important point.

The *cassie* pomade is prepared by macerating the flowers in fat, the process being repeated 8 to 10 times.

It appears that Cannes in France produces from 55,000 to 66,000 lbs. of flowers, every year.

Neroli or Orange Flower.

Pomatum some statistics.

These flowers, when distilled with water, yield an *otto* known as the oil of neroli and when they are treated by the maceration process—by infusion in a fatty body—the orange flower pomatum is obtained..

According to the same authority, a ton of flowers will yield more than a kilogramme of otto, worth £20 and the residuary water another £10.

For the maceration process, about 16 lbs. of blossoms are needed for one of grease, divided over 32 infusions.

Otto.

When the pomade is digested with rectified spirits at sun heat for about a month in the proportion of 6 to 8 lbs. of pomade to a gallon of spirits, an extract of orange flowers is obtained, which is an excellent handkerchief perfume.

Varieties.

Oil of neroli is obtained from the flowers of either the sweet orange known as *citrus aurantium* or the bitter orange *Citrus bigaradia*.

Large industry in France.

This industry is highly developed at Nice in France, where there are hundreds of orange plantations, several of them over one hundred years old.

During the market season for orange flowers, about a month, more than 15 to 18 tons of flowers are sold daily, the bitter orange flowers fetching a value equivalent to about annas six per pound and the sweet about four annas and a half.

Otto from leaves.

Another but inferior kind of *otto* is prepared by distilling the leaves and the young unripe fruits of the different species of the orange. This is used for scenting soap.

The *malnad* highly favourable.

The *malnad* appears to be specially favourable for this industry and type plantations might be organised by Government at important centres favourable for the growth of orange.

Lime juice.

N.B.—Limes also grow luxuriantly in these parts and an industry can be organised to extract the juice from the ripe fruits and an export trade set up.

Thulsi.

Large demand for *thulsi* oil.

There are other plants and seeds which yield an essential oil. For example, the *thulsi* plant, known as the Holy Basil or Ocymum sanctum.

Ocymum sanctum yields an oil from the leaves, for which there is an extensive sale in Europe.

The Hindus rear the plant and it is reported to have the special virtues of disinfecting and vivifying the malarious air.

Thulsi planting in *malnad* desirable.

This point might be verified and, if true, a plantation round each *malnad* village might be organised, thus securing the double object of improving the sanitary condition of the villages and providing a material for a rural industry.

Other oils.

Oils from seeds like *omam* the Indian coriander, cummin seed or *zeerige* and fenugreek—*menthya seed* are also prepared and used.

Dalchinni or Cinnamon Oil (Cinnamum Ivers).

Prepared in the *malnad*.

Cinnamon oil is prepared on a small scale by a number of South Canara labourers all along the western *malnad*, especially in the taluks of Koppa, Tirthahalli, Nagar and Sagar. They obtain licenses from the taluks at Rs. 6 per *bhatti* or pot used in distilling. Old leaves are preferred as their yield is greater and aroma stronger.

The men come from Canara about the end of September and prospect for leaves and then get license to start work. Each gang of 2 or 4 men choses a locality and sets up the distillation apparatus of earthen pots, tubs and bottles. Each gang has as many stills as the number of persons working. The collection of leaves and of working the stills is divided between them. **By Canara people.**

Each *bhatti* yields daily about 2 seers of oil of 24 tolas each valued Re. 1 per seer in South Canara and at 12 annas locally. **Yield.**

The men work for about 3 months from January and return before the rains set in.

Sandalwood Oil.

The most important and valuable of essential oils that can be got from the raw materials available in the Mysore State is *Sandalwood oil*. Sandalwood oil is obtained by distilling chips of the heart-wood of the sandalwood tree (Santalum Album), the root wood being preferred. Although part of the sandalwood oil of commerce is distilled in Europe, from wood exported from India, the oil is also locally distilled in some parts of the Madras Presidency, the stils employed being of a primitive kind. **Where prepared.**

More than 2,500 tons of sandalwood are being annually collected from the forests in the State and sold. The quantity required by a still of an ordinary type does not exceed about 300 tons per annum. **Sandal supply.**

The yield of sandalwood oil is generally put down at 2½ per cent of the wood used. For further information on the subject, see Bulletin No. 8, 1912, published by the Industries and Commerce Committee of the Mysore Economic Conference. **Yield.**

Manufacture of some Indian Scents.

There is a fairly large demand in India for sandal oil, for preparing Indian scents, in the form of sticks, pastes, hair oils and *attars*. Bangalore and Mysore in the Province, and Tanjore, Madras, Puducotta and a few others in the Madras Presidency are the more important centres of production of these Indian scents. **Places.**

Much of the sandal oil consumed in these places is reported to be obtained from Karkal in South Canara and from Kanouj, the scent manufacturers of the Province showing a partiality for the oil from Karkol.

There are about forty families in Bangalore who follow this profession and almost every one of them is either unable or unwilling to give any information of value. **Persons engaged.**

Only one of them, a more intelligent citizen, has furnished me with a few facts and figures and they may be taken for what they are worth. **Information meagre.**

A detailed enquiry is necessary in this field and might be undertaken sooner or later.

According to the informant referred to above, over 360 local maunds of the oil are consumed by the perfume manufacturers at Bangalore and Mysore and about 100 such maunds by those of Madras or about 500 maunds in all. **Sandal oil consumed**

At 2½ per cent of oil from the wood, the quantity of sandalwood consumed would be nearly 200 tons, or only 8 per cent of the average annual Mysore production of that wood. **Wood required.**

The oil was being sold at about Rs. 5 per seer of 24 tolas, a few years back and for the last year or two, the price has practically doubled, to nearly Rs. 9 per seer or Rs. 360 per local maund. **Prices.**

Total value.

At this rate, the value of the annual consumption in Southern India might be roughly set down at about two lakhs of rupees in round numbers.

Other materials required.

The local scent manufacturers also require several other materials for preparing their scents and many of these are obtained from outside Mysore.

Various kinds of *attars* are imported from Kanouj in Northern India, such as those of jasmine (*jaji*,) rose, and screwpine (*thaley*) and all these have sandal oil for their base. The total value of these imports into Bangalore is reported to be about Rs. 25,000 per year.

Rose water is got from Kanouj, to the value of about Rs. 6,000 per annum ;

Punugu chettu from Salem, Coimbatore, etc., to the value of about Rs. 25,000; *Pachapat*, dried leaves of *Patchouli*, from Singapore and Penang, to the value of about Rs. 2,500, at annas 2 per seer ; about Rs. 5,000 worth of *Agar* or *Malagar* from Penang, *via.*, Nagore and Negapatam ; Rs. 6,000 worth of *Nakha* from Tuticorin ; besides large quantities of amber from Jeddah and Muscat. *Lavancha*, *Lavangapattey*, *Bavancha* are local.

Some subsidiary industries and occupations.

The local industry of preparing scented sticks—*Woodubatti* or *Khaddi*, etc., is giving employment to hundreds of Musalman women in preparing thin bamboo splits.

About 600 scented sticks (*Khaddies*) weigh one seer of 24 tolas and the weight of the bare sticks is $\frac{1}{4}$ of that of a scented *Khaddi i.e.*, 600 bare sticks weigh 6 tolas or 100 to a tola or one lakh of sticks bare weigh 1,000 tolas or about one local maund of 24 lbs.

Thin bamboo splits.

One woman is reported to split 48 tolas of bare sticks or nearly 5,000 from bamboo, worth about two annas, and to earn from annas 5 to 6 per day and since 200 women are reported to be engaged in this work, the daily outturn would be about 10 lakhs of 10 local maunds in weight, corresponding to about 40 of scented sticks per day, in Bangalore.

Whether machinery desirable.

These figures require further scrutiny.

It may be suggested that this large quantity of production of the sticks could be prepared, perhaps more cheaply, by a power worked appliance.

But this will throw out of employment the 200 and odd women now engaged in the industry.

Pounding and grinding.

There is another process in the manufacture of scents, which might be operated upon by a power worked appliance.

Over 10 local maunds of leaves, barks, roots, resins etc., are said to be powdered per day, by woman labour, at Rs. 2 per maund, besides 10 more ground with water or rose water. Whether it is desirable to get this work done by a machine driven by power is also a point for investigation.

Some concluding Remarks.

This survey of the main industries in the State is, as the title of the book indicates, intended to be merely a preliminary sketch to be followed by detailed enquiries.

The chief rural industries of carpentry, smithy, pottery, laundry, mat and basket work require a more detailed study than what has been possible at present.

Preparation of ayurvedic medicines from roots, leaves, barks, seeds, gums and salts ; occasional manufacture of pyrotechnic articles ; preparation of bangles of lac, coated with tinsel; of tooth powders, inks and soaps and several such may be taken up.

Before concluding this part of the report, I would like to draw attention to the summary of suggestions including a future programme of work as detailed in Chapter VII, Part I. Side by side with the above, special attention might be devoted to a complete study of all the methods by which the average income of the ryot population at large could be augmented.

At the same time, his mind is to be opened to industrial and commercial possibilities, consistent with his resources and those in materials and power.

A general industrial awakening and activity would then become possible, as well as the formation of Joint Stock Companies with large capital subscribed by a great number of the local rural population, as well as by the urban, with resulting capacity to undertake business on a large and profitable scale and to successfully withstand the keen industrial competition of the Western countries.

I would further invite attention to the urgent need there is for organising a satisfactory system of statistics of production, trade and consumption.

This point is discussed in Chapter I, Part III and suggestions offered at the end of that chapter.

MYSORE, INDUSTRIAL AND COMMERCIAL

PART III.

TRADE AND COMMERCE.

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" D.—Toll Gate Statements of Road Traffic at Bisle, Agumbe and Marnahalli *Ghats*.

MYSORE, INDUSTRIAL AND COMMERCIAL.

PART III—TRADE AND COMMERCE.

CHAPTER I, SOURCES OF TRADE STATISTICS.

Introductory.

Schemes for developing existing industries or for starting new ones require to be based mainly on the extent of demand—local or foreign or both—for the products of such industries.

The quantity of Mysore demand for any one article may be safely taken to be represented by the difference between the quantity of export of that article on the one side and the sum of those of imports and of local production, if any, on the other, of the same or very nearly the same kind of article.

Statistics are therefore necessary regarding, (1) the volume and value of external trade and (2) the quantity of local production, if the organisers of industrial concerns are to be afforded real facilities to launch into such concerns.

The land-locked position of the State and the mountain tracks of its few rivers render possible only two out of the four modes of transporting commodities of merchandise. There is no trade by sea or little or none by river. Most of the trade is rail-borne and the remainder is carried on by road.

Rail-borne Trade.

Sources of trade figures.

There are four sources wherefrom statistics of trade could be gathered and these are:—

(1) Statistics of rail-borne trade, published annually by the Governments of Bombay and Madras.

(2) Half-yearly statistics of rail-borne trade, furnished by the Madras and Southern Mahratta Railway Company and re-published in the Mysore Gazette, since 1907.

(3) Revenue statistics of the Madras and the Southern Mahratta Railway, published half-yearly, and

(4) Annual returns of Trade and Manufacture in each district, prepared by the Deputy Commissioners of districts and submitted annually to the Revenue Commissioner in Mysore.

First source and its value.

1. The first three refer to rail-borne trade; and of these, the first or 1 is the most complete and reliable and has to be compiled from the special publications of Madras and Bombay. This was done for ten years 1890-91 to 1899-00 by the Director of Statistics in 1901 and another for the decade 1901-02 to 1910-11 by the Director of Industries.

This work should be continued year after year by the Director of Statistics.

Second source and defects.

2. The half-yearly statistics of rail-borne trade furnished by the Railway authorities, from the year 1907 onwards, give merely quantities (in Bengal maunds) of 15 articles, as per margin, either exported from or imported into the Mysore State, as a whole.

1. Food grains
   (a) Rice.
   (b) Paddy.
   (c) Ragi.
2. Cotton.
3. Wool.
4. Cotton and woollen goods.
5. Sugar.
6. Jaggery.
7. Oil-seeds.
8. Salt.
9. Wheat.
10. Tobacco.
11. Timber.
    (a) Wrought.
    (b) Unwrought.
12. Kerosine oil.
13. Metals.
    (a) Wrought.
    (b) Unwrought.
14. Cattle.
15. Horses.

Items included.

In the statement for the half-year 1909, the number of such articles was increased to 16, by the addition of the item "Silk," while in that of the first half

of the year 1912, one more item, *viz.*, "Silk Goods" was added and two items, *viz.*, "Salt" and "Kerosine Oil" dropped, keeping the number to 15 still.

Those not included.

The list does not include some of the important articles, such as cotton and woollen yarn, hides and skins, tans and dyes, roofing and flooring tiles of the Mangalore pattern, arecanut, cocoanut, etc. Moreover, separate figures are not available for the various oil-seeds, only the totals of all such being given.

Third source.

3. The Revenue Statistics of the Madras and Southern Mahratta Railway are compiled by the Company more from the point of view of showing their earnings by carrying goods and passengers than for study and the quantities of rail-borne trade are given under 16 heads as per list in the margin.

1. Coal and coke.
2. Cotton, raw.
3. Do manufactured.
4. Dyes and tans.
5. Grains and pulses.
6. Provisions.
7. Metals. Manganese.
8. Metals, other.
9. Oils.
10. Oil-seeds.
11. Salt.
12. Spices.
13. Sugar.
14. Hides and skins.
15. Wood.
16. Other commodities.

Its defects.

It may be observed that the figures relating to many of the items are grouped together and separate returns are not available for many of the locally important articles of merchandise. For example, the total of all the quantities of grains and pulses is given under one head. But this defect might be made up by the figures given for these items in the half-yearly statistics.

The remarks made above in respect of oil-seeds applies here as well. Such important Mysore products as silk, wool, arecanut and cocoanut do not find separate mention; nor are the names and quantities given of the various items included under "Spices." Large quantities are returned under "Others," and the nature and quantities of the several articles under the head are not known.

Internal rail-borne trade.

These figures, however, serve a very important purpose as they give one an idea of the relative importance of the various stations in the State, as regards any one article of merchandise and furnish, besides, some useful information regarding the total bulk of trade in each of the stations. In other words, the statistical information available from the Revenue Statistics of the Madras and Southern Mahratta Railway publications will give one an idea of the volume of internal rail-borne trade in the State.

Compilation tedious.

The work of compiling such statistics is a tedious one, involving much time and labour. For, the 71 Railway Stations of the Mysore State are divided into 28 blocks, with one or more stations in each block and there are 159 such blocks in the whole Madras and Southern Mahratta Railway system. If statistics of rail-borne trade are to be collected for any one of the stations in the State, the same will have to be compiled from 159 separate statements.

Such figures collected with the expenditure of so much time and trouble would, after all, be incomplete, as pointed out already.

Getting station returns preferable

The more satisfactory procedure, therefore, would be to collect the returns of rail-borne trade from every station in the State, by organising a small staff and getting copies of the traffic in each station.

By this method we would be able to get complete returns of trade, both external and internal, for all articles of importance or of interest to Mysore and for every station. That is, we would know the total as well as the detailed traffic at each station, from which full figures would be available for all the rail-borne trade, internal and external, for every important station in the State, as well as for the State as a whole.

N.B.—It may be remarked here that the returns thus compiled and tabulated might be made available to the Amildars and the Deputy Commissioners of Districts, for being embodied in their annual returns of trade and manufacture.

4. The annual returns of trade and manufacture furnished by the Deputy Commissioners of districts constitute another source of statistical information under trade. These returns give the quantities and value of export from and of import into each district, together with the names of places exported to or imported from. They comprise various items falling under the purvey of either the Agricultural, Forest or Geological Departments, though items under the two latter are not complete. **Fourth source.** **District returns.**

Quantities of production of articles like paddy, ragi, cholam, oil-seeds, etc., are given in tons in these district returns, while they are given in *khandies* in the Agricultural Statistics.

By actual weighing and calculation it was ascertained that 7 *khandies* of ragi, paddy or cholam and $5\frac{3}{4}$ to 6 *khandies* of horse-gram weigh a ton. Calculated with these constants, the quantities under the column headed "Estimated actual out-turn" in the Agricultural Statistics do not tally with those given in the district returns, for the same items and year. **Some defects.**

Again, the values for the given weights of the same article are widely different in the different districts and in the same year and are also too high or too slow in several cases.

For example, price of tamarind was annas 7 per maund in Shimoga and Rs. 1-8-0 in Kolar in the same year, *viz.*, 1906-07; that of tobacco Rs. 160 per ton in Shimoga, over Rs. 465 in Kolar and Rs. 250 in Hassan, in the same year.

Export of manganese ore is not recorded in the Shimoga returns nor of timber, sandalwood and other forest products in the *malnad* districts; while Kolar included gold, produced and exported, as also the machinery and silver imported.

Instances might be multiplied.

The total trade of any district, import or export, is now obtained by summing up those for the taluks and it may be remarked that exports from a taluk would also include some imports into the surrounding taluks and vice versa and consequently the mere totalling of the taluk figures under export or import to get the total export or import of the district is open to some objection.

Trade by Road.

The present method, if any, of collecting statistics of the traffic carried on by roads in the State may next be considered.

The road traffic is partly external and partly internal, the external comprising that into and from the bordering British districts, *viz.*, South Canara, Coimbatore, Salem, North Arcot, Ananthapur, Cudappah, Dharwar, etc., while the internal would embrace the traffic between the several places in the Province itself.

Both on account of complexity and smaller importance, the question of arranging for the collection of returns of internal trade by road within the State might be deferred for the present.

At present there is no complete and organised agency to collect returns of external trade by road excepting at some of the toll gates in the *malnad* and Rajakaryapravina, Rao Bahadur, A. Rangasawmi Iyengar, late Revenue Commissioner in Mysore submitted to Government in 1907, *i.e.*, six years ago, a scheme to collect such returns at an estimated annual cost of Rs. 10,032 but with no effect. Subsequently, Rajasabhabhushana, Dewan Bahadur K. P. Puttanna Chetty in his Revenue Administration Report for the year 1910-11, pressed this point on the attention of Government (page 11) and said "the organisation of a satisfactory **No organised agency.**

system of collecting trade statistics is a very pressing necessity and merits very early consideration."

Traffic down some of the ghats at the borders.

There is a heavy road traffic down the ghats to the plains from the three *malnad* districts and so far as I understand, there is no organised agency to record the outward traffic in grains, coffee, arecanut, etc., and whether the returns for these articles are included in the district returns or not is not clear. In either case the returns could not be satisfactory. For if those items be included, they cannot be relied upon for want of an agency to record them. Exclusion of these items would also detract from the completeness or accuracy of those figures. Comment is needless and much reliance cannot therefore be placed on the figures given in the district returns and the Deputy Commissioners of Mysore and Kadur have stated that they would not vouch for the accuracy of the figures submitted by them under trade and manufacture. (Revenue Administration Report 1910-11).

A summary.

This brief examination of the sources of trade returns reveals that the half-yearly statement of rail-borne trade furnished by the Railway Company are not complete, as many items of local importance are omitted and no figures are given under internal trade, while the Revenue statistics published by that company group several items under one head and it is very laborious to collect even these group figures. The time and trouble required to collect these group and incomplete figures might be more profitably devoted to the actual collection of detailed statistics from the various stations in the State. It is also observed that no regular and complete returns are available under road traffic, external or internal. Want of accuracy of the statistics now published is admitted by the Deputy Commissioners and the organisation of a proper agency to collect trade returns was advocated by two Revenue Commissioners and such an organisation is a great necessity.

Production.

The district returns furnish statistics under three main heads, *viz.*, quantities and value of production or manufacture; quantities and value of export; and those of import.

Quantities of production fall under two main heads:—

(i) The raw materials from agriculture, forest and mineral,

(ii) Those manufactured therefrom, being products of industrial operations.

Articles produced.

Quantities and value of products resulting from the industrial or manufacturing operations on raw materials from the three main sources are being obtained now from the managers or owners of such operations and embodied in the annual reports of the Revenue Commissioner and in the Administration Reports of Government.

The present method of getting the quantities and the value of raw materials requires some modification.

Production statistics available and not available.

In the case of agricultural products such as paddy, ragi, cholam, gram, jaggery, statistics of production are available.

But as regards the several other important items, like cotton, mulberry and silk, wool, areca, oil-seeds, cocoanut, betel leaf, coriander, garlic, onions, etc., no information is available regarding production.

Suggestions.

Fresh columns might be added to those in the Agricultural Statistics for the above articles with one more for the number of hand looms in the State.

Production of hides and skins might also be added.

Figures relating to the raw materials of forest and to minerals should be fully included in the returns and it is not the case just now. They are best obtained from the Heads of those departments and under their authority.

A Statistical Department may be organised for at least five years and the following duties assigned thereto :—

(1) Publishing annual reports of production, distribution and consumption of the various articles of agriculture, manufactures and trade.

(2) Publishing leaflets and pamphlets of the same, in the interval, say every month.

(3) Publishing bulletins on matters affecting Mysore, compiling the information from the local and outside sources.

(4) Preparation of a Statistical Atlas of Mysore.

(5) Starting and conducting a journal, to be styled, the Conference Quarterly.

Statistical department to be remodelled.

CHAPTER II.

TRADE IN FOOD GRAINS.

General.

Detailed statistics of the external rail-borne trade of the Mysore State were compiled from those of the two British Presidencies of Madras and Bombay, and first published in 1901 by the Director of Statistics in Mysore, for the ten years 1890-91 to 1899-00 excluding "Treasure." The Director of Industries in Mysore published in 1913, another for the ten years 1901-02 to 1910-11 and including Treasure. These points were refered to in Chapter I.

Sources of the figures.

Figures of rail-borne trade relating to Mysore are thus available for a period of 20 years up to 1910-11, with a gap of one year between, *viz.*, 1900-01 and this omission is of small importance, as full figures are available for two decades, one before and another after the gap and these figures are embodied in 33 statements, Appendix A.

Differences in classification.

A few extra items are added in the later publication, *viz.*, *apparel, fodder, fruits and vegetables, leather unwrought, wood and wheat flour.*

In order to facilitate comparison between the figures under the same groups in the two series of statements referring to the two decades, the extra items have been added on to the heads most akin to them, thus keeping the same number of groups in both the series of statements, excluding Treasure.

Steps taken to facilitate comparison.

Figures under "Apparel" are added on to those under "Cotton manufactured," "Leather unwrought," under "Hides and Skins," though this is not satisfactory; "fruits and vegetables" as well as "wheat flour" under "Provisions;" while the items wood and fodder are brought under "All other articles of merchandise."

Table I gives the total quantities in lakhs of Bengal maunds and their values in lakhs of rupees of the actual annual exports and imports of articles of merchandise, excluding Treasure, for the two decades 1890-91 to 1899-00 and 1901-02 to 1910-11.

Balance of trade not final.

But it should be noted that, from these figures, no inferences of any importance are possible, regarding the balance of total trade of the Mysore State, as the figures do not include the volume of traffic by road between Mysore and the surrounding British districts. For example, much of the Mysore coffee and paddy, is sent by road to Mangalore. Moreover, as pointed out by Mr. Chatterton, the value of sandalwood sent out of Mysore is not duly allowed for, nor that of explosives, candles, coal and coke, etc., imported by the Gold Mines.

Decade averages.

With a view to facilitate ready reference and study, average figures for each of the two decades for all articles are calculated and embodied in Table II.

This table gives, in addition, the average wholesale prices of the various commodities during the two decades, one for each decade.

It is seen from these tables, however, that the decade average of the quantities of import rose by 20 per cent and of values by slightly over 21 per cent, indicating the practically constant character of the prices of imported articles.

Increase of import and export.

In the case of exports, the variation in the decade average, so far as quantities are concerned, shows an increase by slightly over 4 per cent, while as regards values, it is much greater, *viz.*, over 13·5 per cent, indicating that the prices of exported articles have undergone a material enhancement.

Detailed statistics.

The older of the two publications of statistics of rail-borne trade relating to Mysore contains, in addition, detailed statements for five years from 1895-96 to 1899-00, relating to all those items for which similar detailed information is available in the later publication of 1913. This detailed information for 15 years from 1895-96 to 1910-11, with a gap of one year between, *viz.*, 1900-01 has been divided into three groups corresponding to three periods and average figures calculated for each of these for certain articles of merchandise and embodied in a series of tabular statements.

These tabular statements as well as Table III will be utilised in the detailed review of trade in individual items.

Classes of articles.

The 33 groups of articles of merchandise for which figures of rail-borne trade are published fall naturally under seven main classes, *viz.*, (1) Food and Drink, (2) Clothing and Dress, (3) Construction, including Minerals and Metallic Vessels, (4) Fuel and Lighting, (5) Chemicals and Drugs, including Dyes and Tans, (6) Oil seeds and Oils (7) and Others.

The value of the articles of merchandise comprised under the first six classes constitutes over 90 per cent of the total value of all articles including "Others," the proportion being still greater in the case of exports. The first two classes between themselves make up from 66 to 70 per cent of the total, so far as imports are concerned, while, under exports, they make up from 83 to 90 per cent. The other four follow in order of importance in the list of imports, while oil seeds and chemicals rank third and fourth in the export list.

Trade in Food Grains.

Average values of trade figures for the two decades.

Table III gives the average values in round figures in lakhs of rupees for the two decades, columns 2 and 3 referring to the import values and 4 and 5 to those of exports, of articles of food and drink.

It could be seen therefrom that the value of trade in articles of food and drink bears a very large proportion to that of the total trade.

Some points worthy of note.

Secondly, the average value of imports of these articles rose by nearly 15 per cent or about 20 lakhs of rupees, from nearly 138 lakhs of rupees in the first decade to 158 lakhs in the second, whereas in the case of exports, the trade in food stuffs fell by nearly 50 lakhs of rupees from an average of 187 lakhs of rupees in the first decade to that of 138 lakhs during the second ten year period.

A third point which follows from the above but to which attention might, however, be drawn is that whereas, during the first ten years the balance of trade in food stuffs was in favour of exports by about 50 lakhs of rupees, that balance was reversed during the second period and to an extent of about 20 lakhs in favour of imports, *i.e.*, in the first decade the Mysore State supplied more of food stuffs than what it required from outside, while during the second decade, she was, on an average, getting more than sending.

This reversal in the balance of trade warrants a more detailed examination of the statistics under the various groups and sub-groups comprised under the head "Articles of Food and Drink."

Sub-division of articles of food and drink.

The class of articles of food and drink embrace eight groups, *viz.*, Food Grains, Provisions, Spices, Sugar, Salt, Liquors, Tea and Tobacco. The group "Food Grains" includes six items according to the old classification and seven according to the new, with wheat flour added on. Provisions comprise three sub heads, Spices five, Sugar, Liquors and Tobacco two each. Figures under "Wheat Flour" and "Fruits and Vegetables" are brought under "Provisions" in the figures for the second decade.

In point of total trade, provisions rank first. Grains follow second but grains still deserve to be taken up first, as they constitute the necessities of life.

Reversal of the balance of trade in food grains.

The general remarks passed regarding the reversal of the balance of trade under "Articles of Food and Drink" is found to be true as regards "*Food Grains*" as well. For, whereas during the first ten years, the average value of imports of "Food Grains" into the Mysore State was over 26 lakhs of rupees and export 53 lakhs, showing a balance in favour of exports to the extent of about 27 lakhs of rupees, the balance of trade during the second decade was turned in favour of imports since the value of the imports of grains into the Mysore State exceeded that of exports by nearly 20 lakhs of rupees, being the excess of 49 lakhs over 29 lakhs.

Mysore demand for outside rice.

This reversal is brought about by a considerable decline in the value of exports of *ragi* from 28·7 lakhs to 11·8 lakhs or by 17 lakhs of rupees and of *cholam* from a little over 12 lakhs of rupees to six, making up a reduction of nearly 23 lakhs of rupees under these two heads alone. In addition to the considerable fall in the trade under *ragi* and *cholam*, there has been a very marked rise in the imports of *rice*, or the Mysore demand for *rice* rose by over 17½ lakhs of rupees during the two decades, from an average of 17½ lakhs in the first to nearly 35 in the second. The value of *gram* and *pulse* sent into the Mysore State also doubled itself during the 20 years, from an average value of about 4·25 in the first half of the period to that of about 8 lakhs of rupees in the second. The only item in which there has been some slight expansion in the value of the export trade is in the case of paddy from 6 to 6·4 lakhs of rupees.

It is thus seen that the Mysore people are dependent on the bordering British districts and other places for a considerable quantity of *rice* required for daily consumption and it is a point requiring serious attention that this dependence should have on an average doubled itself during the second decade.

Paddy.

Area under paddy to yield quantity of rice equal to that imported.

It will be interesting to find out the acreage under paddy equivalent to the quantity of *rice* being imported and also the proportion which this quantity bears to the whole production of *paddy* in the State.

From a study of the average production of *paddy* in the State for 14 years from 1897-98 to 1910-11, it is ascertained that on an average the quantity of production of that grain is about 4 khandies per acre or 640 measuring seers (1 khandy = 160 seers) or 1,280 lbs, *i.e.*, 16 Bengal maunds nearly. The quantities of *rice* corresponding to the average value of import of 17½ and 35 lakhs of rupees in the two decades are given to be 4·87 and 8·13 lakhs of Bengal maunds respectively. The quantities of *paddy* corresponding to those of *rice* would be 8·8 and 15 lakhs of Bengal maunds and the number of acres which will yield these quantities would be about 55,000 in the first case and nearly 90,000 in the second, or in other words, area under *paddy* equivalent to that under that crop either in the Kadur or in the Hassan district is just sufficient to yield this large average quantity of *rice* which is being imported into the Mysore State.

Estimating production.

The next question is what is the proportion of this quantity of imported *rice* to the production from the whole State and whether it is possible to produce this quantity of *rice* locally.

In order to answer this point in some detail, Table II, Part I has been prepared. Column 2 shows the average acreage under *paddy* during each of the three periods into which the 14 years for which full data are available might be

divided, column 3 the average outturn expressed in annas in the rupee, column 4 the estimated actual outturn in khandies and in Bengal maunds. Columns 5 and 6 show exports and imports of *paddy* in lakhs of Bengal maunds, column 7 balance, *i.e.*, consumption, store, or that moved by traffic by road, column 8 the average price in the period in seers per rupee and in Bengal maunds. The next column shows the value of consumption while the two following show average population for the period and consumption per head in quantity and value.

The actual estimated outturn in *khandies* is given for the years 1904-05 onwards, while those for the years previous thereto have been calculated as follows:—

A constant deduced and utilised.

The average is taken of the total number of khandies of production of *paddy* given for the seven years 1904-05 to 1910-11 as well as the average of the outturn expressed in annas in the rupee, besides that of the areas in acres. The quotient obtained by dividing the quantities in khandies by the product of the two averages of outturn in annas in the rupee and of average acreage under the crop, gives the average quantity in khandies corresponding to one anna crop from one acre.

This constant is now used to determine the quantities in *khandies* from the acreages for which anna crops are given. The product of the three figures, *viz.*, the average acreage, the average outturn expressed in anna crop and this constant, gives the average production in *khandies*, corresponding to the averages of the areas cultivated and of the anna crop.

Calculated in this manner, it is found that the productions in khandies for three periods are 27·45 lakhs and 27·59 lakhs and 28·26 lakhs of *khandies*, which correspond to about 110, 111·8 and 113 lakhs of Bengal maunds respectively. It is thus seen that the export and import figures under *paddy*, as such, or that corresponding to the import of *rice* do not constitute any very large and alarming proportions.

Production and consumption.

The consumption is, however, found to be more than the production, though the excess does not constitute more than 11 per cent in any case.

The average price for these periods is taken from a special publication by the Agricultural Department and also compiled from the issues of the Mysore Gazette for some of the later figures. The prices are in seers per rupee at the retailed rates. I have adopted these retail rates as the consumer in the main is only a retail buyer.

Value of consumption.

The total value of consumption thus calculated rose from about 236 lakhs of rupees in the first period to 245 in the second and 316 in the last.

It is remarkable to find that the number of seers of *paddy* representing the consumption per head of population varied within narrow limits, *viz.*, between 89 and 90 measuring seers.

The value of consumption per head of population rose from 4·4 rupees to 5, representing a rise of about 23 per cent in the retail prices of *paddy* in the last two quinquennial periods. The value of produce of paddy per acre has risen from 30 to 40 rupees during the last two periods.

Industrial aspect.

The main point of industrial importance suggested by this great dependence of the Mysore people on outside source of supply of *rice* is whether the resources admit of development, so as to necessitate the introduction of more *rice* mills. Vigorous steps are being taken to increase the area under wet cultivation. The trade figures show that there is very little export of *rice* or import of *paddy*, while there is a decent export of the latter commodity. The very large production of *paddy* less that carried by road and rail is being locally converted into *rice*, either by the

hand labour of paddy huskers distributed all over the rice tracts or by the few rice mills in Mysore, Yedatore, Alur and Arsikere but in order to mill the paddy produced from the prospective increase in the area under that crop, it would need the establishment of several rice mills in the Province of the size of the *Cauvery* rice mill in Mysore and working for 300 days. If, however, the Mysore demand for *rice* rises again to be what it was in the years 1908-09 and 1909-10, *viz.*, about 63 lakhs of rupees worth or 12·7 lakhs of Bengal maunds corresponding to the produce of paddy from over 1½ lakhs of acres, then the number of mills will have to be increased proportionately and if lastly the size of the mills be reduced to allow small capitalists to work them, the number required will be still further increased.

Prospective increase of rice mills.

New places for rice mills.

The Shimoga district with its 2¼ lakhs of acres under paddy would be a very suitable new area and at Shimoga might be established a large mill. One mill capable of hulling about 50 pallas or 125 Bengal maunds of paddy per day might be established at each of the taluks of that district. This would be a fair beginning. According to the latest Agricultural Statistics, from 20,000 to 50,000 acres are under paddy in the six western taluks and one small mill would in the course of a year of 150 working days, require the production from nearly 1,200 acres yielding about 16 Bengal maunds per acre.

Some special advantages in favour.

There are several reasons why the Shimoga district should be chosen for establishing new rice mills. It is the largest paddy growing district in the State. Except the paddy required for local consumption which is pounded by the paddy huskers, it is reported that nearly 50 per cent of the production from the large area is sent out by rail and road.

Considerable saving in freight and cartage will be effected if rice be so sent instead of paddy, since the paddy bears to the rice therefrom a ratio of 20 to 11 by weight. Labour is scarce in the *malnad*, raw material is abundant, wood fuel is cheap and capital available from Sowcars. Hence a power mill would be an advantage there. Such mills would besides help people to colonise and improve the resources of the *malnad*.

As in Japan, water power rice mills might be also thought of, for Shimoga.

There are of course certain difficulties in the way which have to be enquired into in detail and either cleared up or substantiated before any serious attempt is made to establish such mills in the Shimoga district.

Several points for enquiry.

It appears that the *malnad* paddy does not stand being pounded into rice but that the rice is broken into pieces during the process. This is probably due to the difficulty of having the paddy well dried before it is pounded or milled, on account of the peculiar climatic conditions of the district, of continued rainfall and of damp atmosphere, during many months in the year.

Whether rice is broken to pieces.

It appears also that it is for this reason that the paddy is boiled before being converted into rice. It is, therefore, desirable to ascertain if the rice is actually broken into pieces, and if so, whether it is due to any inherent property of the paddy itself or whether it is due to climatic conditions mentioned above.

If it be due to the latter cause, then the difficulty is practically insurmountable, for the paddy boiled will also have to be well dried before it is pounded or milled and when the people of the *malnad* have not paid any great attention to a similar question, *viz.*, the difficulty of getting arecanuts well dried before exporting the same, it is highly unlikely that they will interest themselves in arranging to get dried a much more bulky and less valuable article than areca, *viz.*, paddy.

But with the sympathetic pursuation from people of capacity and earnestness

of purpose who can win their confidence, it would be possible to devise and introduce measures for drying areca and also paddy, if this latter be found a necessary step.

Whether polished rice is nutritious or healthy

A second point requiring investigation and decision is whether the paddy should be merely unhusked or should be polished also. For it appears* that the rice polish is twice as nutritious as the polished rice itself. It is also stated that cleaned rice is infested with fungi developing *beri-beri* and that for consumption as rice and not for flour, etc., it is advisable to store paddy and prepare rice when it is required.

Comparative yield of rice.

There is still another point that has to be considered.

It is reported that the rice pounders and huskers agree to give 320 seers of rice for every 640 of paddy, whereas from the mill only 300 seers can be got. This is one reason ascribed why the power mill for rice did not get popular at Tumkur.

Want of capital.

Another reason ascribed to the unsatisfactory returns from the working of the existing mills is the want of capital to maintain a large stock of paddy to keep the mill working throughout the year.

Working rice mills with capital borrowed at heavy rates of interest does not pay.

Rice milling not continuous.

During the period of work of rice mills, the earnings are no doubt very attractive and if the work could continue, the profits also would continue. The proprietors of some of the rice mills are working with borrowed capital and as the profits of a few months are to be distributed over the whole year, they hardly find it possible to pay even interest on borrowed capital and to make both ends meet.

Road traffic in paddy.

Another step to be taken before deciding upon the question of establishing rice mills in the Shimoga district is to ascertain by careful and detailed enquiry the extent of downward and outward traffic in paddy by means of carts into the bordering British districts of the two Canaras, mostly to the South.

Some idea of the magnitude of this traffic in paddy by road might be gathered from a study of the toll gate returns maintained in the Ghats at Agumbe, Marnahalli, Bisle and at several others. During the year 1908, 3,634 cart loads of paddy were sent down to South Canara *via.*, Agumbe amounting to about 50,000 Bengal maunds, whereas over 23,000 maunds were despatched *via.*, Marnahalli in the year 1910-11.

Statistics wanting.

From these figures alone it appears clear that a very decent quantity of paddy is being sent out by road and collection of statistics under this head is absolutely necessary.

Future rice mills to be a co-operative basis.

It appears to be advisable that rice mills suggested to be established in the Shimoga district should be organised on a co-operative basis, since many of the Sowcars are also owners of paddy lands or have a hold in those lands.

Ragi.

Points for enquiry suggested by trade figures.

The decline in the volume of export trade in *ragi* from an annual average of 13 lakhs of Bengal maunds during the first decade, valued at about 29 lakhs of rupees to 4·8 lakhs of Bengal maunds valued at about 12 lakhs of rupees, shows a contraction by about 60 per cent, while there is a slight rise in the quantity and value of *ragi* sent into the Province.

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* "The World's Commercial Products" by Messrs. Freeman and Chandler.

Contraction of trade balance.

This net contraction in the balance of trade suggests an enquiry if the production of *ragi* in the State has suffered any reduction or if the figures merely meant that the people have recommenced their old system of storing some quantity every year in under-ground pits called *hagave*; or again if the contraction of the rail-borne trade was attended with corresponding expansion of trade in this article by road.

Area under *ragi*.

It is seen from Table III, Part I, that the average area under *ragi* did suffer some slight fall in the first quinquennial period from about 22 lakhs to 21·7, though it increased to 22·5 during the last quinquennial period.

Production.

In the case of *ragi* and of other dry crops, inferences drawn as to production from mere acreages under the crops need not always correspond with the actual production, in as much as the quantity of yield from an acre varies very considerably with the character of the season. This variation is reflected in the numbers—annas in the Rupee—representing the ratio of the actual estimated outturn to the standard under normal conditions. Now this average outturn for ragi rose fron 7·45 to 7·66 and 8 in the three quinquennial periods with the result that the production also rose from 33 lakhs of *khandies* in the first two periods to 36 in the third corresponding to 132 lakhs and 144 lakhs of Bengal maunds respectively. If, to these figures, the average quantities of import be added and from the sum thus obtained, those of exports be deducted, the balance obtained will represent the consumption, store or traffic by road.

Consumption.

Calculated in this manner, 120·5 lakhs of Bengal maunds were retained annually in the first four years and 127·7 lakhs during every year of the second and 140·5 in the third. The money value of these average quantities of consumption, etc., of *ragi* during the three periods was 229 lakhs 217 lakhs and 364 lakhs of rupees respectively. Assuming the average population during these three periods to be 54, 56 and 58 lakhs respectively, the balance of ragi in favour of the ryots works to an average of 90 seers per head of the value of about 4 rupees during the first period, to nearly 94 seers of the same value of 4 rupees in round figures for the second; while in the third, there is an increase both in the quantity and value of the *ragi* balance *viz.*, 99·31 seers and 6·28 rupees respectively.

The production per acre works to about 240 seers during the first two periods and 256 seers in the third.

Export to production.

The quantity of export was nearly $\frac{1}{11}$th of the total production in the first period while it fell to $\frac{1}{21}$th of the same quantity in the second and to nearly $\frac{1}{33}$th in the third.

Inference.

The inference can therefore be safely drawn that, as regards the most important staple food grain of the State, *viz.*, *ragi*, the production has been on the increase, the export on the decrease and the balance in favour of the ryots on the increase both in quantity and in value.

Industry possible.

The only industry that suggests itself possible utilising *ragi* for its raw material is that of converting it into flour by starting several flour mills. The demand for flour is very great, since all the ragi has to be milled into flour before use but this large demand is met by the extensive use of mill stones in almost every household of the ryot and no special charges are incurred for converting *ragi* into flour, since the women folk of the ryot's family attend to this work.

In the course of my tour in the Province, one or two enquiries were made by employers of labour on some scale whether, at a cost of a thousand rupees at the maximum, a milling plant could be set up to supply flour from one palla of *ragi* daily-

Of course such demands are few and far between. The point to be ascertained is whether the ryot will care to use ragi flour from a flour mill and also whether it would pay him to buy the flour, especially as ragi supply is locally derived from his own fields and the conversion is effected by the labour of his own people for which he has not been accustomed to attach any money value in the form of wages.

A small experiment may, however, be tried and ragi milled into flour and circulated. **A suggestion.**

The small demand from a few employers of labour for a small plant to convert ragi into flour might be met by suggesting the use of coffee grinders of large size.

Cholam.

The fall in the export of cholam by nearly 50 per cent during the two decades from a little over 4 lakhs of Bengal maunds valued at about 12 lakhs of rupees to 2 lakhs of Bengal maunds, of 6 lakhs of rupees in value, together with an increase in the value of imports by about a lakh of rupees in the course of the two decades under review, are evidently due to a fall in the production from 8¾ anna crop in the first four years to 7·7 and 7·9 in the second and third periods, and to decrease in area under the crop from 6·5 to 5·4 and 6·2 lakhs of acres. The balance of production after allowing for trade figures has fallen from about 28 lakhs of Bengal maunds in the first five years (1895-96 1899-00) to an average of about 22 in the next five, though during the third, the original has been reached. Further information about cholam will be found in Table IV, Part I. **Production and consumption of *cholam*.**

The only industrial aspect of cholam lies in milling it into flour as in the case of ragi and the remarks about ragi apply in this case as well.

Gram and Pulse.

In the case of gram and pulse, there has been a fall in exports during the two decades from 1·7 lakhs of maunds of about 5 lakhs of rupees in value, to 1·1 valued at 4 lakhs, while as regards imports, the value practically doubled itself from 4 to 8 lakhs of rupees.

A study of the Agricultural Statistics under horse gram compiled in Table V, Part I, shows that the area under gram and pulse has fallen from 7·6 lakhs of acres during the first period, while it fell to nearly 7 lakhs during the second and to 6 in the third. The productive capacity of the land has on the other hand been on the increase from 6·5 to 6·9 and 6·6 anna crops during the three periods, and it has risen from 23 to 26 lakhs of Bengal maunds in the first two periods with a fall to about 18, during the third. **Of gram and pulse.**

After allowing for trade figures, the balance in favour of the ryot has risen from 23 to 28 and then fell to 19·3 lakhs of Bengal maunds during the three periods.

Much of the import under these heads is due to the large supply of the *dholl* sent into the Mysore State from the bordering British districts of Salem and Vellore. There is not much of *togere* or *dholl* cultivation in the Mysore State and these figures indicate the need there is for expanding the area under this crop. **Need for expanding area under *dholl*.**

Wheat.

The external trade in this article is one of import mainly. The bulk of the import trade is small and the quantity is on the decline from 81,000 Bengal maunds valued at 2¼ lakhs of rupees in the first decade to only 61,000 of value of nearly 3 lakhs of rupees. **Trade in wheat small.**

It is seen incidentally that the price per Bengal maund rose from about $3\frac{1}{3}$ rupees to $4\frac{1}{2}$ in the course of the 20 years.

Area under wheat small.

A reference to Agricultural Statistics shows that during the three quinquennial periods from 1895-96 onwards, the area under wheat was very small as compared to those under other grains and has suffered considerable contraction from an average of 3,300 acres in the first period to one of 2,900 and of 2,000 in the second and third.

Export practically nil and some import.

Taking the yield from one acre under wheat to be about $3\frac{1}{2}$ pallas or 8 to 9 Bengal maunds, the average production during each of these three periods could not have been much more than 26,000 23,000 and 16,000 Bengal maunds respectively, while during 1910-11, it could not have exceeded 13,000 Bengal maunds. Seeing that there is little or no export, the whole of the production and of import must be cosumed in the State and the quantity thus consumed would not, on an average, exceed one lakh of Bengal maunds of a value of 4 lakhs of rupees.

If the whole of this wheat consumed in the State could be grown locally, then an area of about 11,000 acres would be found sufficient but the maximum area under wheat from 1895-96 onwards was only about 5,000 acres and it has been steadily contracting ever since.

Where cotton, cholam or oil seeds are now grown.

Formerly, all those parts in the districts of Chitaldrug, Shimoga, Kadur and Hassan, produced this grain also but, of late years, the little production there is of wheat in the Province is practically confined to the district of Chitaldurg and that to the taluks of Hiriyur, Challakere, Chitaldrug and Molakalmuru.

The main use for wheat is in the preparation of wheat flour for consumption and as this demand for flour is steadily increasing, it is advisable that the production of wheat is increased.

General introduction of wheat as an article of diet in the form of cakes, bread or biscuits is certainly an important step towards increasing efficiency of human labour and, on this ground alone, it is advisable to encourage the expansion of wheat cultivation.

What is called *durram* wheat is reported to be a drought resisting crop, capable of flourishing even in regions of scanty rainfall, of not more than 10 inches. It is a point left to the consideration of the Agricultural Department for any experiments being undertaken in this direction.

TABLE I.

Total Quantity (in lakhs of Bengal maunds) and value (in lakhs of rupees) of Imports and Exports of Merchandise, from 1890-91 to 1910-11.

Years	Quantity		Value		Remarks
	Imports	Exports	Imports	Exports	
1890-91	33·13	40·74	250·11	287·49	
1891-92	41·66	31·40	269·33	268·99	
1892-93	48·55	37·69	320·92	307·48	
1893-94	52·83	48·08	306·87	309·67	
1894-95	56·76	33·71	326·10	317·83	
1895-96	66·16	33·38	361·08	357·10	
1896-97	64·95	36·96	354·60	362·37	
1897-98	75·70	50·86	426·10	412·06	
1898-99	84·09	29·00	363·64	305·08	
1899-00	83·22	29·40	377·45	335·29	
Decade average ...	60·71	37·12	335·62	326·33	
1901-02	76·62	25·04	374·67	295·96	
1902-03	72·37	30·15	328·72	299·15	
1903-04	72·39	28·30	346·18	298·76	
1904-05	76·44	32·80	393·16	329·58	
1905-06	65·24	40·50	404·48	474·98	
1906-07	76·36	45·77	428·44	406·19	
1907-08	76·56	62·47	426·03	439·70	
1908-09	79·65	47·65	482·21	412·79	
1909-10	67·44	33·38	458·10	412·31	
1910-11	59·27	40·72	434·79	336·88	
Decade-average ...	72·23	38·67	407·47	370·63	

TABLE II.

Decade averages of quantities and values of Articles of Merchandise, excluding Treasure, the two series of figures under each article relating to the two decades.

Articles of merchandise	Imports			Exports			Remarks
	Quantity	Value	Rate	Quantity	Value	Rate	
Animals	...	1·06	...	...	·64	...	
	...	2·11	...	...	1·26	...	
Apparel	...	...	...	...	...	...	
	·027	4·81	...	·007	·86	...	
Coal and coke	24·11	19·33	...	...	...	...	
	18·33	13·22	...	...	...	...	
Cotton raw	0·24	3·99	16⅝	·23	4·00	17¼	
	0·25	5·14	20½	·74	15·37	20¾	
Cotton manufactured ...	1·09	60·30	60	·18	6·80	38	
	1·34	75·14	57	·14	7·22	51	
Drugs and chemicals ...	0·11	5·82	53	·01	0·96	96	
	0·21	13·61	65	·035	3·17	90½	
Dyes and tans	·31 *	3·57	11·5	·85	8·00	9½	
	·34	2·2	6½	1·5	3·82	over 2½	
Gram and pulse	1·43	4·25	3	1·72	5·28	3	
	2·36	8·20	3½	1·10	3·98	3½	
Jawar and bajra	·084	·21	2½	4·4	12·36	less than 3	
	·313	1·04	3½	2·11	6·39	over 3	
Paddy	·20	·40	2	2·74	5·95	over 2	
	·11	·32	3	2·37	6·40	2¾	
Rice	4·87	17·53	3⅗	0·15	0·73	5	
	8·13	34·80	4⅛	0·11	0·54	5	
Wheat	0·81	3·03	3·7	·032	·12	4	
	0·67	3·04	4½	...	...	5 only one year.	
Others (ragi mainly) ...	0·34	0·73	over 2	13·0	28·70	2⅕	
	0·49	1·28	over 2½	4·80	11·80	2½	
Total ...	7·74	26·17	3⅜	22·0	53·15	2 7/10	
	12·90	53·21	4⅛	10·54	29·37	2 8/10	

Quantities in lakhs of Bengal maunds and values in lakhs of rupees.

* The two decades are:—1890-91 to 1899-00 and 1901-02 to 1910-11.

TABLE II—*contd.*

Articles of merchandise	Imports			Exports			Remarks
	Quantity	Value	Rate	Quantity	Value	Rate	
Hides and skins (including leather unwrought) ...	·43	15·6	36·3	1·01	62·9	62·3	
	·38	13·13	34·5	1·54	97·12	63	
Horns	95	1,400	15	1,700	27,000	16	The average in this case is given in actual maunds and rupees
	...	...	...	...	54,000	...	
Hemp and other fibres ...	·012	·06	5	·05	·33	6·6	
	·02	·28	14	·04	·42	10½	
Jute	·60	6·65	11	·11	1·22	11	
	·48	5·90	over 12	·13	1·57	12	
Leather (manufactured) ...	·013	1·79	149	·004	·64	160	
	·003	·53	177	·003	·42	140	
Liquors	·44	23·91	54	·042	1·31	31	
	·37	15·33	41	·153	3·09	20	
Metals	3·07	24·52	8·0	·18	2·21	12⅓	
	3·45	32·21	9·3	6·61	8·52	11⅓	
Oils	1·28	8·15	over 6	·13	1·6	12	
	2·77	18·04	over 6	·075	·88	11	
Oil seeds	·31	1·75	over 5	3·53	17·55	5	
	·472	2·02	4⅓	4·37	24·18	over 5	
Opium*	...	...	...	...	...	...	
	...	...	...	...	...	...	
Paper and paste board ...	·07	·94	13	·001	·01	10	
	·13	·90	7	...	...	...	
Provisions	1·87	42·87	23	4·43	94·45	over 21	
	1·23	24·82	20	2·20	34·04	15	
Wheat flour	...	...	...	...	...	...	
	·80	4·51	5⅝	·04	0·30	9	
Fruits and vegetables ...	...	...	...	...	...	...	
	·84	4·00	nearly 5	2·85	13·07	4·7	
Fodder	...	...	...	...	...	...	
	1·0	·72	nearly ¾	·16	·33	2	
Railway plant and rolling stock	·45	1·92	4	·02	·14	7	
	·52	2·10	nearly 4	·18	·8	over 4	

* Figures are available for only a few years and hence averages are not calculated.

TABLE II—*concld.*

Articles of merchandise	Imports			Exports			Remarks
	Quantity	Value	Rate	Quantity	Value	Rate	
Salt	4·38	15·27	3 2/5	·003	·001	3 1/3	
	5·99	14·77	2 1/2	·006	·020	3 1/3	
Saltpetre	·02	·24	12	·001	·01	10	
	·022	·16	7 1/4	·0003	·003	10	
Silk, raw	·0001	·10	1,000	·02	18·15	907 1/2	
	...	...	...	·053	35·32	666	
Silk, piece goods	·002	1·96	98	·0005	·58	116	
	...	...	...	·0005	·32	...	
Spices	·68	13·89	20 1/3	1·00	23·57	23 1/2	
	1·117	24·76	22	1·39	39·96	28 3/4	
Stone and lime	1·80	1·18	2/3	·09	·06	2/3	
	2·75	1·67	7/10	·02	·01	1/2	
Sugar	1·07	7·13	6 7/10	1·72	14·39	8 1/3	
	1·76	11·20	6 1/3	2·51	18·30	7 1/3	
Tea	·01	·90	90	·0008	·06	75	
	·012	·78	65	...	...	...	
Tobacco	·46	7·58	16 1/2	·02	·39	19 1/2	
	·64	9·46	15 1/4	·06	1·02	17	
Wool, raw	·02	·48	24	·03	·70	23 1/3	
	·05	·96	19 1/5	·008	·19	23 3/4	
Wool, manufactured ...	·02	3·18	159	·05	7·40	148	
	·022	2·50	114	·051	6·77	132	
Wood, manufactured ...	...	...	...	...	...	...	
unmanufactured ...	9·46	31·75	2 1/3	1·48	5·44	3 2/3	
All other articles of merchandise	9·98	34·95	3 1/2	1·38	4·84	3 1/2	
	4·56	15·96	3	1·40	4·91	3 1/2	

TABLE III.

Decade average values, in lakhs of rupees of Exports and Imports of Articles of Food and Drink.

Name of article	Imports		Exports		Remarks
	1st decade 1890-1900	2nd decade 1901-02 to 1910-11	1st decade 1890-1900	2nd decade 1901-02 to 1910-11	
Ragi	.73	1·3	28·7	11·8	
Paddy	·4	·32	5·95	6·4	
Rice	17·5	34·8	·73	·5	
Cholam	·21	1·04	12·36	6·39	
Gram and pulse	4·25	8·2	5·28	3·98	
Wheat	3·0	3·04	·12	·002	
Total of all grains ...	26·2	48·7	53·1	29·0	
Provisions (including wheat-flour and vegetables and fruits)	43·0	33·0	94·0	47·0	
Spices	14·0	25·0	24·0	30·0	Betel nuts, cardamoms, chillies, ginger, pepper and others.
Sugar	7·0	11·0	14·0	18·0	Refined and unrefined.
Salt	15·0	15·0	...	...	
Liquors	24·0	15·0	1·3	3·0	
Tea	·9	·8	...	...	
Tobacco	7·6	9·46	·4	1·0	
Total ...	137·7	158·0	187·0	138·0	

TABLE IV.

Grain and Pulse—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Gram and pulse ...	1st ...	1·65	5·4	2·0	7·1	
	2nd ...	2·38	7·3	·88	2·9	
	3rd ...	2·4	9·0	1·3	5·0	
Javar and bajra ...	1st ...	·12	·3	5·1	16·3	
	2nd ...	·02	·10	2·6	7·3	
	3rd ...	·64	2·0	1·6	5·4	
Rice in the husk ...	1st ...	·14	·3	1·4	3·4	
	2nd ...	·13	·3	1·5	3·3	
	3rd ...	0·2	·7	3·2	9·5	
Rice not in the husk	1st ...	5·76	20·4	·23	1·2	
	2nd ...	6·9	25·4	·13	·56	
	3rd ...	9·3	44·17	·13	·63	
Wheat ...	1st ...	·72	2·9	·04	·16	
	2nd ...	·56	2·2	...	...	
	3rd ...	·8	3·8	...	...	
Others mainly ragi ...	1st ...	·30	·6	10·4	21·2	
	2nd ...	·36	·75	5·45	12·0	
	3rd ...	·63	1·8	4·1	11·5	
Total	1st ...	8·7	29·9	19·2	49·0	
	2nd ...	10·35	36·05	10·56	26·06	
	3rd ...	13·97	61.47	10·33	32·03	

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.

1st means first period 1895-96 to 1899-00.

2nd means second period 1901-02 to 1905-06.

3rd means third period 1906-07 to 1910-11.

CHAPTER III.

TRADE IN PROVISIONS, SPICES, SUGAR AND OTHERS.

Provisions.

Trade in the first decade.

Trade in provisions has been a very prominent feature of the external rail-borne trade of the Mysore State. During the first decade 1890-91 to 1899-00, both the exports and imports have been very heavy. The figures for the first decade are taken from the statistics of trade published in 1901. According to that publication, the export value has always been in excess of that of import, the difference varying from about 70 lakhs of rupees in 1890-91 to about 30 in 1897-98 with an average annual balance of about 51 lakhs of rupees, in favour of exports. The actual annual value of the export trade in provisions during that decade was by itself very considerable, varying from a minium of about 81 lakhs in 1891-92 to a maximum of about 115 lakhs in each of the years 1895-96 and 1896-97, with an average of about 94 lakhs of rupees, for the decade 1890-91 to 1899-00.

Exports.

Imports.

As regards imports, the minimum value was about 20 lakhs of rupees in 1890-91 and the maximum of about 63 lakhs in 1895-96, the average annual value working to about 43 lakhs of rupees.

Second decade.

The figures for the second decade have been compiled from the "Review of the External Trade" published in 1913. Even in the decade, the trade in provisions has still been contributing considerably to the total of the Mysore rail-borne trade, and excepting in one or two years, the export value has always been in excess of that of import. The maxima of 39 and 45 lakhs of rupees were reached in the years 1908-09 and 1909-10 respectively, while the average annual value for the decade amounted to 34 lakhs of rupees, without "wheat flour" and "fruits and vegetables" and to about Rs. 47 lakhs with their values added.

Exports.

Imports.

The average value of imports during the decade commencing with 1901-02 was about 25 lakhs of rupees and the maxima of 29 and 31 lakhs respectively in the two years 1909-10 and 1907-08 and with *wheat flour* and *fruits and vegetables*, the figure would be 33 lakhs.

Fall in trade.

It would be seen from the above that there has been a very considerable reduction in the average annual value of exports and imports, during the two decades from 94 to 47 lakhs of rupees under exports and 43 to 33 lakhs under imports.

Attempts at explanation.

Such very large differences demand an explanation and it is not easy to find one. Whether this difference might be due to any change in the classification of goods is an explanation that suggests itself. There has been a change and so far as *provisions* go, the only new items which are considered separately in the publication of the second decade and which might have been included under *provisions* in the publication of the first decade are *fruits and vegetables* and *wheat flour*. Even if the average values of exports and imports under these two heads be added on to those under *provisions* in the figures for the second decade, still the average value of exports is only 47 lakhs of rupees while that of imports 33. There is still left a difference of about 47 lakhs between the average values of exports of the two decades and of about 10 lakhs in those under imports.

Hence we must look for an explanation elsewhere for this great fall in the value of trade in *provisions*.

Sub-divisions under *provisions.*

The items into which *provisions* are sub divided are three in number, in both the publications and they are the same, *viz.*, *dried fruits and nuts*, *ghee* and *others*. Detailed figures under these three heads are available for five years 1895-96 to 1899-00 in the first publication and for ten years 1901-02 to 1910-11 in the second The figures for these 15 years, with a gap of one year between, are divided into three groups of five years each, averages taken for each period and Table V prepared giving these averages.

A study of Table V shows that, as regards the export trade, the figures under *dried fruits* and *nuts* have been remaining steady at about 25 lakhs of rupees, those under *ghee* practically insignificant throughout, while the values of exports under the head "Others" have suffered an enormous reduction from an average of about 72 lakhs in the first five years to 21 lakhs in the second, including *fruits and vegetables* and to 23 in the third, the value of *vegetables and fruits* contributing over $\frac{2}{3}$rds or about 15 lakhs of rupees in the last quinquennial period.

It is therefore under the head "Other provisions" that we have to look for an explanation to account for the considerable fall in the value of the export trade.

Other *provisions.*

As regards the variations in the values of import of Provisions, it is under the head "Other Provisions" again that we have to look for the cause of the great and sudden decline in the value of the import in as much as the value of imports of *fruits and nuts* has *risen* and not *fallen* but very slightly from 4 to 5 and 7 lakhs of rupees during the three quinquennial periods and the import value under *ghee* has been practically constant at about 7 to 8 lakhs of rupees per year throughout the period.

Items.

The following are some of the important items which fall under "*Other Provisions*," *viz.*, fruits dried or preserved, fish salted and unsalted, dried and preserved, coffee powder in tins, biscuits, canned and bottled provisions, condensed milk, almonds, dates, becons and hams, cheese, etc.

Most of these would come in well under imports and not under exports, so far as Mysore is concerned. It is the great and sudden fall in the value of exports that cannot be accounted for by any possible reduction in the exports of these articles.

Further enquiry needed.

Again a reference to the value of the articles exported and imported during the three quinquennial periods shows that the export value per Bengal maund of the articles sent out has fallen from Rs. 28 to 16 and 17 respectively, while those of imports also show a decline from 24 to 19 and 18 rupees and these figures give no clue, as the values exclude *fruits and vegetables*. The question is still an open one and no satisfactory explanation is forthcoming. But as the point is a very important one, a special investigation into the question seems called for.

Dried Fruits and Nuts.

Copra.

In the case of Mysore, *dried fruits and nuts* are practically synonymous with *copra*, more especially the latter, and the average quantity of *copra* exported would correspond to the production from about 33,000 acres or nearly one half of the total area under that crop in the Province, without any admixture of areca gardens. As *copra* is in great demand for consumption in Northern India, and as nearly half the production from the cocoanut area in the State is thus sent out, any industry possible with cocoanut for raw material will have to be based on the production from the other half. Here again, there is the local demand for cocoanut as a direct article of food.

Suggestions regarding the utilisation of the *fibre* and of the *shell* will be found elsewhere in Part I.

Ghee.

There appears to be an immense possibility in the production and preparation of *ghee*, especially because of the facilities for grazing of cattle in several parts of the province. That Mysore should be dependent upon outside areas for a part of its supply of one of the most important articles of food is explicable if we remember that buffaloe cows number only 85,000 and that local cows are not good milkers. **Possibilities.**

Dairy Farms may, however, be established in several parts of the Province with imported buffaloe cows.

The price of ghee has gone up considerably and has practically doubled itself from an average of about Rs. 12 ten years ago to Rs. 22 and Rs. 23 per local maund at present. Much of the supply is derived from Salem and Coimbatore and adulteration has become very frequent. The demand for pure ghee is great and constant, and extraction of butter and preparation of ghee would therefore offer some very good opening to small capitalists.

Places near Harihar would be suitable as water is abundant in the perennial Tungabhadra. Extensive grazing grounds can be had near the hill sides about 10 miles to the west of Harihar. Good milking she-buffaloes may be brought easily from Poona, Belgaum and Dharwar. **Places suggested for dairy farms.**

Areas in some parts of Nanjangud and others round Mandya might also be thought of in this connection.

Manufacture of *condensed milk* and of *preserved milk* are also industries that might be considered under "Provisions." **Condensed milk.**

Other industries which might be thought of under this head are:—Preparation of biscuits on a large scale; of marmalade from orange peel available in considerable quantities between Hunsur and Coorg. The jack fruit of the malnad now going to waste, the wood apple so abundant near Huliyur and other places, the mangoes of the *malnad* and of the avenue trees of several parts of the State, might all be considered as raw materials for the manufacture of various kinds of tinned farinaceous foods. **Biscuits marmalade.**

Preparation and export of pickles and chutnies would also provide some new occupations. **Pickles and chutnies.**

It appears that lemon can be very easily cultivated in the malnad. An industry might be set up to extract the juice, bottle and export it or to prepare citric acid.

I would suggest a much more detailed enquiry being undertaken to ascertain the present and potential possibilities of the nature and quantities of the raw materials, from which various kinds of tinned and bottled provisions can be prepared and if the enquiry results favourably and holds out a good prospect, then a couple of enterprising young men might be sent out to Europe, America and Japan to study the Chemistry and Mechanics of canning and bottling. **Tinned and bottled provisions.**

Preparation of dried vegetables on a large scale for export is another art that might be usefully learnt and introduced, as valuable vegetables can be raised in considerable quantities in the Mysore Province, especially round about Bangalore. **Dried vegetables**

Spices.

The group *spices* comprises *betel nuts*, *cardamoms*, *chillies*, *pepper* and *others*. Trade in these articles is on the increase, both outwards and inwards and the exports are in excess of the imports. In the course of the two decades, the exports have risen by about 67 per cent from 24 to 40 lakhs, while the supply to Mysore rose by nearly 74 per cent from 14 to 25 lakhs of rupees on an average, Table III.

Arecanut.

Exports. Now, looking into the detailed statement Table VI, giving the average quantities and value for each of the five items for the last 15 years, divided into three quinquennial periods, it is seen that in the case of betel nuts, there has been an expansion of trade, both inwards and outwards, the average annual value of the exports having increased from 19 to 23 and 28·25 lakhs of rupees. The export in the last period is roughly equivalent to the production of areca from about 15,000 acres in round numbers.

It might be noted here that the total area under areca by itself is about 27,000 acres, while about 55,000 acres more contain both arecanut and cocoanut.

Imports. The imports have been steadily increasing and more rapidly than the exports from 5 to 7 and 12½ lakhs of rupees. Some of the people of the State go in for inferior areca from the West Coast while they send out articles of greater value.

Cardamoms.

Cardamoms are exported, there being no import trade in that article and the value of the exports rose from 1·8 to 4·9 lakhs of rupees in the first two quinquennial periods and fell to about 4·4 lakhs in the last.

Chillies.

Export of *chillies* is on the decrease on the whole, while imports are on the increase.

Pepper.

Trade in *pepper* is small, while that in other *spices* is pretty heavy.

Other Spices.

Sudden increase in the export trade in "other spices." The quantities and values of imports under this head have been practically steady throughout the 15 years at ·35 lakhs of maunds and 10 lakhs of rupees respectively, while the sudden expansion in the export trade from an average of 18,000 Bengal maunds in the first two quinquennial periods valued at about 5¼ lakhs of rupees to 28,000 Bengal maunds of a value of over 13¾ lakhs of rupees during the third is worth notice. The increase in quantity was slightly more than 55 per cent, while that in value rose to more than 157 per cent, *i.e.*, nearly three times as much as that in quantity.

Other items that might be classed under *spices* are :—*Coriander, mustard, cummin seeds, garlic, onions*, etc. But the values of these articles cannot be so high as that indicated above, *viz.*, Rs. 48 per Bengal maund.

Export of coffee by rail. But there is one item, *coffee*, which might have been included under "*other spices*" as its value is very nearly that indicated above. It has been ascertained that considerable quantities of *coffee* are being railed from Birur, Tarikere and Paschimavahini Stations. During the years 1909-10, 1910-11 and 1911-12, there were despatched from the Birur Station alone, quantities of coffee represented by 17,840, 12,100 and 21,000 Bengal maunds respectively, while those from Tarikere amounted to 1,360, 710 and 2,331 maunds for the same years. A part of the production of coffee from Coorg is also being sent by railway from Paschimavahini and the total average from these three Stations works to about 18,500 Bengal maunds per year, during the last three years.

Moreover, the rise in the price to Rs. 48 as noted above cannot be due to any great rise in prices, since it is not noticeable under imports nor under exports for the first two quinquennial periods.

The actual export of coffee by rail has not been classed under *other provisions* since the average export value per Bengal maund of *other provisions* is low and ranges between Rs. 15 to Rs. 20

Not included under *Other Provisions* but under *Spices.*

It may therefore be taken as correct that much of "*other spices*" exported during the last quinquennial period practically meant coffee.

There are some industrial aspects connected with the production of betel nuts which are worth notice. There is a considerable quantity of areca fibre now going to waste and the quantity available of the dried fibre is estimated to be double that of the arecanut prepared ready for the market. If 20 local maunds of 24 lbs each be taken as the average production from an acre of areca garden, the quantity of fibre would be 40 maunds or nearly $\frac{2}{5}$ths of a ton and for the 27,000 acres and odd, the quantity would be about 10,800 tons from the garden for areca unmixed with cocoanuts. There is, besides, the quantity of fibre available from gardens in which both areca and cocoanut are grown. Can this be used for paper pulp for stuffing in place of or along with cocoanut coir?

Some industrial aspects.

Areca fibre.

The next point of industrial importance in connection with betel nuts is the desirability of devising a method of peeling off the shell of the arecanut from the nut inside, without, in the least, harming the nut.

Devise needed for peeling areca shell.

The labour available for removing the shell consists almost entirely of females of the locality—Birur and Shimoga. The owners of areca gardens find it extremely difficult to induce these females to do this work for them. The women, however, are so skilled in the art, that with an ordinary device worth not more than a few annas, they perform the work so dexterously that the men are compelled to beg of them to accept the job.

There is still another point on which the areca grower needs help. The difficulty of getting the boiled nut to dry well in places like Shimoga has necessitated the choice of the nearest station on the plain—Birur—where this process is much facilitated and attempts being made for some years past to prepare the nut ready for the market in Shimoga itself instead of at Birur, have not been very successful, in as much as the nuts do not dry up well but, on the other hand, the nuts prepared and stored up in Shimoga absorb moisture, swell up and deteriorate.

And for drying areca in the *malnad.*

The people of Shimoga and of other areca regions like Thirthahalli, Sagar and Koppa will be only too happy to receive instructions as to the method of drying the arecanuts after boiling and of storing the prepared nuts, so as to be free from swelling, if stored for some time.

The industrial aspect of cardamoms is only a small one. The whole production is being sent to Haveri in the Dharwar District where it is bleached and is then ready for the market. It would certainly be desirable to have this work done in a suitable place in the Province, say. at Arsikere. The question of extracting oil or essence fron cardamoms may also be considerd. Preparatiou and export of *pepper powder* suited to European tastes or of essence of pepper, from the *khan* pepper of Sorab and other areas of the westernmost *malnad* or even from the leaves of the vine are points that might be investigated.

Cardamoms to be bleached locally.

Some pepper preparations.

Fruits and Vegetables.

Considerable quantity of oranges and mangoes, besides apples are being sent out of the State, the whole of the orange being produced in Coorg and sent to Mysore and Paschimavahini *via* Hunsur.

Potatoes constitue a very important item of export from stations between Bowringpet and Whitefield. During the year 1911 nearly 64,000 Bengal maunds

were sent out of Malur, about 57,000 from Whitefield, whereas during the next year the quantities were 41,000 and about 33,000 Bengal maunds respectivety.

Sugar.

The varieties of sugar substance for human consumption comprise mostly of refined sugar, sugar-candy, etc., cane jaggery and *mogadum* sugar, *i.e.*, powdered jaggery, while those for industrial purposes are mainly molasses, palmyra jaggery and very inferior kinds of cane jaggery.

The Goribidnur sugar factory.

The molasses required for the Distillery were being supplied locally from the Goribidnur Sugar Factory, so long as the late Messrs. Arbuthnot Company were the Proprietors of that Factory and were also the manufacturing contractors of the Government Distillery in Bangalore. But since the failure of that firm, the Sugar Factory at Goribidnur passed over to the Arbuthnot Industrials, Limited, and the contract work of distilling arrack in the Government Distillery passed to other hands, with the result that the Goribidnur Firm could no longer find a ready market for their molasses. This fact coupled with the fall in the prices of the refined sugar imported into India from Rs. 11 to about Rs. 8-7-0. in the 15 years prior to 1910-11, due probably to the abolition of the counterveiling duty on foreign bounty-fed cheap sugar led to a contraction in the business of the Sugar Factory at Goribidnur.

This Factory, which was started in 1894, produced 2,280 tons or about ·62 lakhs of Bengal maunds in that year, at a local value of about 4·5 lakhs of rupees *i.e.*, Rs. 7-4-0, per Bengal maund, while the value of the imported refined sugar ranged at about 11. It thus paid the firm to produce decent quantities and to export the same at about Rs. 10 per Bengal maund, while owing to the difficulties mentioned above, the production dwindled to nearly one-third, *viz.*, 800 tons or about 21,600 maunds in the year 1910-11 and the value of the production was estimated locally at 1·44 lakhs of rupees. The business, however, expanded in 1912 as indicated by the production of about 47,000 Bengal maunds valued at about 4·7 lakhs of rupees.

If the Goribidnur Sugar Factory could manage to get a sale for their molasses, they may, perhaps, be able to lower their prices.

Balance of total trade in favour of export.

The Mysore State has been sending sugar and jaggery and also receiving. And the trade has expanded in both the directions during the two decades. The value of the quantity sent out increased from 14 to 18 lakhs of rupees, while that of the receipts rose from 7 to 11 lakhs, with the net result that the balance of trade was in favour of export, to the extent of 7 lakhs of rupees throughout.

Reversal of balance of trade in refined sugar.

During the first five years 1895-96 to 1899-1900, the average export of refined sugar exceeded the import by 43,000 Bengal maunds, indicating a large local production as well as some consumption, whereas, during the third quinquennial period ending with 1910-11, the balance of trade was reversed and the quantity imported exceeded that exported by 58,000 Bengal maunds and the price of the imported article was only Rs. 8-7-0 per Bengal maund, while that of export was about 10½ rupees. See Table VII appended to this Chapter.

Refined sugar getting more popular.

The value of imports has practically doubled itself during the first and third quinquennial periods, while the reduction in the scope of operations of the Goribidnur Sugar Factory are, I believe, reflected in the steady contraction in the value of exports of refined sugar, from about 7·7 lakhs of rupees in the first quinquennial period to about 3 in the second. It is thus clear that refined sugar is getting more popular.

Unrefined sugar is either jaggery or molasses. Jaggery under this head is mostly palmyra jaggery so far as imports are concerned and required for the Goribidnur Factory, while under exports, it is the usual jaggery suited for human consumption, either in the form of balls or small blocks. Molasses fall under imports and it is not known if any from the Goribidnur Factory is exported, as well as from the few small local sugar refineries in the Mulbagal taluk. **Unrefined sugar.**

This interpretation is based upon the values of import under jaggery, molasses, etc., which is about Rs. 5 per Bengal maund while that of export is about Rs. 7.

The import trade in molasses, palmyra jaggery, etc., has risen from about 96,000 Bengal maunds in the first five years to 1,22,000 in the second, with a slight fall to 1,16,000 Bengal maunds in the third. The value of this import has not varied very much in the fifteen years, the range lying between 5·7 to 6·3 lakhs of rupees. **Increase of import.**

The export trade in *mogadum* sugar has risen slightly during the decade ending with 1910-11, from 69 to 79,000 Bengal maunds, while that in jaggery rose also slightly from 1·37 to 1·48 lakhs of Bengal maunds. **Of export.**

The value of export of total edible jaggery rose from 13·7 lakhs to 15·8, during the decade 1901-02 to 1910-11.

It will be interesting to ascertain the quantity of production of cane jaggery, both powdered and compact, in the State, by adopting a calculation similar to that for food grains. Utilising the Agricultural Statistics published by Government, it is found that during the 4 years ending with 1900-01, the quantity of production per annum was, on an average, 25·4 lakhs of local maunds or 7·47 lakhs of Bengal maunds, while during the two halves of the decade ending with 1901-11, the quantities of production per annum were, on an average, found to be 10·54 and 9·7 lakhs of Bengal maunds respectively. **Production.**

In order to calculate the quantity of consumption of the various forms of sugar in the Mysore State, the quantities entered under imports of unrefined sugar embracing molasses and palmyra jaggery have been omitted and the quantity under "unrefined sugar" proper was included. The exports under "unrefined sugar" being composed entirely of jaggery powdered, balled or square blocks used for human consumption are taken into the calculation. Thus calculated, the quantity of consumption of unrefined sugar and jaggery is found to be 7·47, 8·58 and 7·50 lakhs of Bengal maunds respectively during each of the three five year periods.

Making allowance for the quantities of export and import of refined sugar, the quantities or the balances left are found to be 7·04, 8·48 and 8·10 lakhs of Bengal maunds and if an average of production of refined sugar be assigned at about 38,000 Bengal maunds, the total average quantity consumed would vary from 7·42, 8·86 and 8·48 lakhs of Bengal maunds respectively in the three five year periods. **Consumption.**

Assuming the average population to be 54, 56 and 58 lakhs of persons respectively in the three periods, the quantity consumed works to about 10·6 lbs. per year in the first period, 12·4 lbs. in the second and the third or an annual average of nearly 12 lbs. in the 15 years, or 1 lb. per month per head of population.

The Mysore people thus consume about half a maund per head per year of the various forms of sugar, especially the jaggery.

Details regarding production and consumption are given in Table VIII, Part I.

Liquors.

The great reduction in the average value of import of liquors from 24 to 15 lakhs of rupees and the slight increase in the value of exports from 1·3 to 3 lakhs speak for the local production of arrack and other liquors in the Government Distillery at Bangalore and in the Breweries at Cantonment.

Tobacco.

The trade in *tobacco* is one entirely of import and it has varied very slightly from 7·6 to 9·46 lakhs of rupees.

Oil-Seeds.

Trade in oil-seeds has been one of general expansion in quantities and value, under exports and imports, though the export trade is ten to twelve times that of import.

During the first decade, Mysore sent out about 3½ lakhs of Bengal maunds of oil seeds valued at about 17½ lakhs of rupees, and received about ·3 of a lakh, valued at about 1¾ lakhs of rupees, while during the next, the quantities and values of exports rose from 25 per cent to 33 per cent respectively and reached an annual average of 4·4 lakhs of Bengal maunds, valued at about 24 lakhs of rupees, as against an average import of nearly half a lakh of maunds worth nearly two lakhs of rupees.

A reference to Table VIII shows six headings under oil-seeds, *viz.*, *til* or *jingelli*, *castor*, *earthnuts*, *poppy*, *rape* and *mustard* and *others*.

Trade in *jingelli* constitutes nearly two thirds of the total trade in all oil-seeds, while that in *castor*, about one sixth, on an average, for the fifteen years, those under *others* ranking next. Trade in *poppy* seeds is one entirely of import and comparatively small and that in *rape* and *mustard* is one of export.

Til or Jingelli.

Trade in *jingelli* is mainly one of export and has on the whole been expanding from an annual average value of nearly 14 lakhs of rupees in the first five years, to about 17 lakhs in the second and nearly 20 lakhs in the third.

Castor.

Trade in *castor* is also one mainly of export, although the average annual quantities sent out has fallen from about 82,000 Bengal maunds, valued at about 3½ lakhs of rupees in the first two periods to about 33,000 Bengal maunds valued at about 1¾ lakhs of rupees in the third.

It would be advisable to enquire into the cause of this fall, especially in connection with the suggestions to rear Eri cocoons, fed on *castor* leaves.

Other oil seeds so far as Mysore is concerned would be mostly *hutchellu* and the export trade in this article has increased six fold in the third period, to nearly 90,000 Bengal maunds valued at about 3·4 lakhs of rupees.

A reference to the Agricultural Statistics shows that the average area under oil seeds is about 2,80,000 acres, which, at an average yield of about 4 Bengal maunds per acre, would yield about 11 lakhs of Bengal maunds and the average annual export will thus be about 36 per cent of production; or roughly, a little over a third of the oil-seeds produced in the State is sent out by rail, the remaining two thirds making up the consumption, stores or that moved by traffic by road.

Oils.

Trade in oils is one mainly of import and this has been increasing steadily from about 10 lakhs of rupees in value in the first period to about 14 in the second

and to about 22 in the third, while the value of exports was only 1·4 lakhs of rupees in the first period ·82 in the second and 1·24 in the third.

Analysing the quantities and values of oils under the four heads given in Table IX, *viz.*, *kerosine*, *cocoanut*, *castor* and *others*, it is found that trade in *kerosine* constituted about 84 per cent of the total trade in all oils, while in value it formed about 62 per cent.

The import trade in *kerosine* oil has nearly doubled both in quantity and value, in the course of the 15 years ending with 1910-11.

Import in *castor* oil has also been on the increase from 26,000 rupees in value to about 93,000, while the export values of the same have been steadily going down, from 69,000 rupees to about 28,000 that is, the balance of trade has changed from one in favour of exports to that of imports.

The export of *cocoanut* oil has been practically constant in value. while the import value has been steadily rising from about 60,000 rupees in the first to about a lakh of rupees in the third.

Trade in *other* oils has been one of import and is next in value to that in *kerosine* oil, having varied from an annual average of about 2·8 lakhs of rupees in the first period to about 4·3 in the second and 7·7 in the third, *i.e.*, the trade has practically trebled itself in the course of fifteen years.

Other oils include the large quantity of lubricating oil required for railway and for industrial machinery in the Kolar Gold Fields and elsewhere in the State. The increasing consumption of petrol consequent on the steady increase in the number of motor cars and motor cycles in the Province must also fall under this head, probably accounting, partly at least, for the observed expansion of import under *other* oils.

These *other* oils probably comprise also some *jingelli* oil and *earthnut* oil.

The import of *jingelli* and *earthnut* oils necessitate the organisation of more oil mills, worked by power.

Gundlupet and Nanjangud in the Mysore district and Hosdurga, Chellakere Molakalmuru, as well as Davangere, in the Chitaldrug district would be suitable places for establishing power-worked oil mills for *jingelli*.

TABLE V.

Provisions—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Dried fruits and nuts ...	1st ...	·3	4·03	1·94	25·15	
	2nd ...	·35	4·64	1·89	25·73	
	3rd ...	·46	6·96	1·46	24·68	
Ghee	1st ...	·19	6·55	·006	·02	
	2nd ...	·19	6·5	·003	·1	
	3rd ...	·19	7·74	·007	·24	
Others	1st ...	1·74	41·00	2·62	72·00	
	2nd ...	·58	11·19	·57	9·78 or 21·0	without fruits and vegetables with fruits and vegetables and wheat flour.
	3rd ...	·7	12·60	·48	7·63	
Total	1st ...	2·23	51·58	4·56	97·17	
	2nd ...	1·12	22·33	2·46	35·61	
	3rd ...	1·35	27·30	1·94	32·55	

TABLE VI.

Spices—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Betel nuts	1st ...	·19	5·22	·7	19·38	
	2nd ...	·33	7·3	·99	23·0	
	3rd ...	·49	12·5	1·08	28·25	
Cardamoms	1st ...	...	·07	·008	1·81	
	2nd ...	...	...	·03	4·9	
	3rd ...	...	...	·03	4·39	
Chillies	1st ...	·3	2·9	·17	1·65	
	2nd ...	·32	2·81	·06	·50	
	3rd ...	·34	3·21	·11	1·16	
Others	1st ...	·36	10·09	·19	5·47	Coriander, menthya, cummin seeds, mustard, garlic, onions, etc.
	2nd ...	·35	10·28	·17	5·0	
	3rd ...	·34	11·43	·28	13·48	
Total	1st ...	·85	18·28	1·06	28·31	
	2nd ...	1·00	20·39	1·25	33·40	
	3rd ...	1·17	27·14	1·50	47·28	

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.
1st means first period 1895-96 to 1899-00.
2nd means second period 1901-02 to 1905-06.
3rd means third period 1906-07 to 1910-11.

TABLE VII.
Sugar—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Refined Sugar	1st ...	·33	3·66	·76	7·7	
	2nd ...	·28	2·75	·38	4·21	
	3rd ...	·86	7·27	·28	2·96	
Unrefined—						
1st ... Sugar	...	·96	5·72	1·10	6·7	
Jaggery, etc.	...	...	...	...	...	
Total	...	·96	5·72	1·10	6·7	
2nd ... Sugar	...	·10	·73	·69	4·83	
Jaggery, etc.	...	1·12	5·29	1·37	8·87	
Total	...	1·22	6·02	2·06	13·70	
3rd ... Sugar	...	·07	·53	·79	5·81	
Jaggery, etc.	...	1·09	5·80	1·48	10·02	
Total	...	1·16	6·33	2·27	15·83	

TABLE VIII.
Oil-seeds—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Castor	1st ...	·05	·20	·82	3·46	
	2nd ...	·02	·06	·82	3·41	
	3rd ...	·06	·31	·33	1·73	
Earth nuts	1st ...	·026	·11	·09	·40	
	2nd ...	·07	·27	·014	·07	
	3rd ...	·15	·80	·13	·78	
Poppy	1st ...	·023	·17	...	...	
	2nd ...	·04	·23	...	...	
	3rd ...	·05	·38	...	...	
Rape and mustard	1st ...	...	...	·11	·59	
	2nd ...	...	...	·11	·56	
	3rd ...	...	...	·22	1·34	
Til or Jingelli	1st ...	·035	·19	2·56	13·76	
	2nd ...	·04	·22	3·32	17·06	
	3rd ...	·06	·44	2·78	19·64	
Others	1st ...	·1	·47	·16	·58	
	2nd ...	·22	·69	·15	·45	
	3rd ...	·29	1·11	·90	3·38	
Total	1st ...	·23	1·14	3·74	18·8	
	2nd ...	·39	1·47	4·41	21·55	
	3rd ...	·61	3·04	4·36	26·87	

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.
1st means first period 1895-96 to 1899-00.
2nd means second period 1901-02 to 1905-06.
3rd means third period 1906-07 to 1910-11.

TABLE IX.

Oils—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Kerosine oil	1st ...	1·32	6·43	·026	·13	
	2nd ...	1·95	8·81	·05	·23	
	3rd ...	2·70	12·6	·04	·18	
Castor	1st ...	·019	·26	·05	·69	
	2nd ...	·025	·32	·05	·17	
	3rd ...	·06	·93	·02	·28	
Cocoanut	1st ...	·04	·60	·016	·25	
	2nd ...	·04	·63	·02	·26	
	3rd ...	·05	1·02	·01	·27	
Others	1st ...	·18	2·78	·02	·30	
	2nd ...	·28	4·28	·011	·16	
	3rd ...	·43	7·71	·03	·51	
Total	1st ...	1·56	10·06	·12	1·38	
	2nd ...	2·29	14·04	·13	·82	
	3rd ...	3·24	22·26	·10	1·24	

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.

1st means first period 1895-96 to 1899-00.

2nd means second period 1901-02 to 1905-06.

3rd means third period 1906-07 to 1910-11.

CHAPTER IV.

TRADE IN ARTICLES OF CLOTHING AND DRESS, INCLUDING HIDES AND SKINS.

General.

A reference to Tables X and III shows that trade in "articles of clothing and dress" ranks, in point of importance, next only to that in those of "food and drink" with one important difference, however, in point of total trade, *viz.*, that, whereas, under "articles of food and drink," the balance of total trade showed a reversal from exports to imports in the course of the two decades ended 1910-11, that balance under "articles of clothing and dress" has been in favour of exports throughout the 20 years.

It has also increased seven-fold, from about 8 to 57 lakhs of rupees.

There has been an expansion in trade from 94 to 108 lakhs of rupees in the case of import and 102 to 165 lakhs in that of export.

Of the two main divisions into which this class might be sub-divided, *viz.*, the *textiles proper* and *hides and skins*, the former contribute the main bulk of the value under imports, while the value in hides and skins makes up a decent and large proportion of that under exports, during both the decades.

Out of the 33 groups of articles of merchandise excluding Treasure and Bullion, six fall under *textiles* proper and, with jute and other fibres, the number rises to 7.

Mysore trade in Textiles.

Mysore trade in textiles proper is, on the whole, one of expansion, more under exports, than under imports. See Table X. The increase by nearly 80 per cent in the average values of export of articles of clothing, including raw materials, from nearly 37 lakhs in the first decade to 66 lakhs in the second is due mainly to the larger quantity and greater value of cotton and of silk sent out of the State, whereas, the rise by 27 per cent in the value of such articles brought into the Mysore State from an average of nearly 70 lakhs of rupees every year, during the first decade, to that of about 89 lakhs, during the second, is due almost entirely to the increase, by nearly 34 per cent, in the value of import of cotton manufactured articles including apparel, from an annual average of 60 lakhs of rupees during the first decade to one of 80 lakhs during the second.

Is one of expansion

Cotton, Raw.

The export trade in cotton raw has nearly quadrupled itself from an average value of 4 lakhs of rupees in the first decade to one of over 15 during the next.

Export trade in cotton quadrupled.

The import trade which has also expanded has risen by only 25 per cent from 4 lakhs to 5.

From a study of Table VI, in the "External Trade of the Mysore State" published by the Director of Industries and Commerce, it is seen that the average quantity of production of cotton raw was about 74,000 Bengal maunds in the first five years 1901-02 to 1905-06 and 104,000 Bengal maunds in the next, from average areas of 60,000 and 75,000 acres, yielding at 1·19 and 1·54 Bengal maunds per acre respectively. The latter rate of 1·54 Bengal maunds of lint or 126·28 lbs. corresponds to nearly 2½ local maunds of *kapas* or seed cotton, a figure which is not

Production of cotton.

much lower than 22½ local maunds, ascertained to be the quantity of average production per acre.

The increase by 40 per cent in the value of the yield from an acre of cotton crop from about Rs. 25·4 during the first five years of the decade 1901-02 to 1910-11 to nearly Rs. 36 during the second has stimulated an increase in the area under cotton, from an average of about 60,000 acres during the first to 75,000, in the second half of the decade.

Reason of increasing import.

It might be asked why, with this increase in the production of cotton, the quantity of import should have risen or for the matter of that, why there should be any import at all. The reason is not far to seek. Manufacture of cotton yarn requires an admixture of varieties of cotton and the cotton imported is of inferior value.

Consumption of cotton by the mills and production of yarn.

The two mills in Bangalore have been consuming an average of 32,000 Bengal maunds of ginned cotton during the quinquennial period 1901-02 to 1905-06 and about 49,200 Bengal maunds every year in the next. Allowing 17 per cent for waste during spinning, the cotton consumed ought to have yielded about 27,000 Bengal maunds of yarn, on an average, in the first five years and 41,000 in the second, whereas the actual figures of production of yarn by the mills are found to be 23,600 and 41,000 Bengal maunds respectively, the difference being somewhat appreciable in the first case and nothing at all in the second.

The excess of production of cotton over the consumption by the two mills will certainly be enough to feed two more mills of the type now working, and if imports of cotton be added on, the total of 134,000 Bengal maunds would support from three to four such mills.

With a likely increase in the near future in the production of Cambodia cotton, one more point would be secured in favour of attempts at starting more spinning and weaving mills in the Province.

Cotton Manufactured.

These fall under five heads, *viz.*, *yarn—Indian* and *European* and *piece goods Indian* and *European* and *others*. The total trade in these articles has been one of expansion by about 34 per cent both under exports and imports.

Total import value ten times that of export.

The import value in each decade is found to be exactly ten times that of exports. During the first decade, 1890-91 to 1899-00, 60 lakhs of rupees worth of cotton manufactured articles were brought into the Mysore State as against only 6 lakhs of rupees worth sent out, whereas during the next decade the corresponding values were 80 lakhs and 8 lakhs of rupees respectively.

Twist and Yarn.

Import of European yarn and value.

Trade in European twist and yarn is one entirely of import and it has remained practically steady during the first two quinquennial periods from 1895-96 to 1905-06 at 12,000 Bengal maunds valued at nearly 7¾ lakhs of rupees and has suffered a slight fall during the third to 9,000 Bengal maunds of 6½ lakhs of rupees in value. The value of the yarn works to about Rs. 61 per Bengal maund or annas 12 per lb.

Yarn from Indian mills and value.

Trade in *Indian twist* and *yarn* was mainly one of imports and it has risen from 17,000 Bengal maunds in the first quinquennial period to 27,000 in the second and to about 26,000 in the third. The value of the Indian yarn and twist has been only 30 to 40 rupees per Bengal maund, as against 61 in the case of that from Europe, showing thereby that the Indian yarn used up in Mysore is of lower counts

than that from foreign countries, unless much of the imports from Europe consists of coloured yarn.

The export of Indian yarn from Mysore is evidently a part of the production from the local mills and it ranged from 14,000 and 10,000 Bengal maunds to 14,000, in the three quinquennial periods, at an average price ranging between 6 to 8 annas per lb.

Consumption by handlooms.

It has been pointed out in Part I that the handloom weavers have been consuming about 51,000 Bengal maunds of yarn per year, on an average, during the first five years of 1902-11 and 52,000 per annum in the next, while the corresponding quantities for the mills were 4,500 and 9,900 Bengal maunds respectively, showing thereby that the handlooms were consuming between 11 to 12 times the quantity used up by the mills in the first five years and over 5 times the same quantity during the second.

And by mills.

Since the quantity consumed by the handloom weavers has been practically constant and since the production of yarn in the mills increased by 67 per cent during the period, the consumption of yarn by the mills and production of cloth have practically doubled during the decade.

Piece Goods.

A reference to Table XI in Part I shows that the Mysore people have been patronising, to an equal extent, the piece goods from European mills and those from the Indian.

Piece goods form bulk of cotton manufactured.

Table XI Part III shows that the bulk of the trade under cotton manufacture is in piece goods, ranging in value from about 50 to 60 lakhs of rupees during the second ten years, while the value of twist and yarn remained practically stationary at about 17 lakhs of rupees.

The export in Indian piece goods which ought to include a part of the production from the local mills has been very small, from 1 to 2 lakhs of rupees worth, during the decade.

Mysore consumption of cloth, equally supplied.

A glance at the first table will also show that the people of the Mysore State have been consuming an average of 1½ lakhs of Bengal maunds of cloth every year, made up of nearly one-third from the production from the local handlooms in cotton and two-thirds from mills in and outside the State and to a very small extent from outside handlooms.

Consumption per head.

The statement also shows that the consumption per head of population increased during the decade 1901-02 to 1910-11 from about 2·13 lbs. of cloth per year valued at about Re. 1-4-0 to Re. 1-6-0 to 2·21 lbs. valued at Re. 1-9-0 per year.

Silk, raw.

Estimating production of silk. Difficulties.

Attempts at estimating the annual quantity of production of raw silk from the State are beset with greater difficulties for want of data, than in the case of cotton, raw. The quantity of production of raw silk depends, to a great extent, on the acreage under mulberry cultivation, the character of the season influencing the quantity of the yield of leaf, as well as the health of the worms, besides on several others.

As regards area under mulberry, figures for one year have been obtained with considerable delay and there is no record in the Agricultural Statistics of the total area under mulberry. Again, even with a good supply of suitable leaf, the worms get diseased if the seasons be unfavourable and the crop of cocoons fails to a greater or less extent and, with it, the quantity and quality of silk available from such cocoons.

Special enquiry needed. The only source of information available at present as to the quantity of production is from private accounts of the merchants and as there are many such merchants and scattered over parts of the Bangalore, Kolar and Tumkur districts, a special officer will have to be told off for this duty, for at least three months, if complete information is to be obtained.

Estimates of production of silk manufactured goods will likewise have to be obtained by a method similar to the above.

Contraction of import trade. The import trade in silk manufacture has practically dwindled to nothing from 2 lakhs worth in the first decade, while that in export is very small and even this shows a decline.

Expansion of export. The trade in raw silk has increased cent per cent from an average of 18 lakhs of rupees during the first decade to one of 35 lakhs during the second.

Wool, raw.

Production. The 2½ millions of sheep in the State would yield about 3⅛th millions of pounds of raw wool, at the rate of 10 ozs. for each of the two shearings in the year or 1¼ lbs. per sheep per year

Trade. Trade in wool is very small compared to the production of that article in the Mysore State.

The average export of wool is 1,000 Bengal maunds and import 5,000 Bengal maunds and the balance of 4,000 Bengal maunds or 3·28 lakhs of lbs. added to production of 31·25 lakhs of pounds would give a quantity of 34·53 lakhs of lbs. consumed by the handlooms for wool in the State and by the woollen mills.

Consumption. Though the Binny Mills could consume 2 lakhs of lbs. of wool per month or 2·4 millions per year, they actually consumed a much smaller quantity during the year 1910-11, *viz.*, 8·68 lakhs of lbs.

It is thus seen that out of the two consumers of raw wool, the woollen mills had, for their share, in 1910-11, 8·68 lakhs of lbs., a quantity which is just a third of that used by the handlooms, *viz.*, 25·85 lakhs of lbs.

Woollen Manufactures.

Trade in woollen manufactured goods indicates a tendency to decline both under exports as well as under imports. But the balance of trade was in favour of exports by 4·4 lakhs in the first decade and 4·3 in the second. The bulk of the export comes from the woollen mills, while the products of the handlooms are consumed to a greater extent locally than are sent out.

Hides and Skins.

Export trade important The Mysore State has been sending out *hides* and *skins* to a much greater extent than receiving, and the balance in favour of export rose from an average of about 47 lakhs of rupees every year during the first decade to 84 lakhs per annum during the second. Thus the export trade is one of very great importance.

Main items. The main items of trade under this head are skins raw, leather unwrought, skins dressed or tanned and lastly hides, dressed and raw.

Trade in skins. The trade in skins presents two points for note. One is the contraction in the local industry of dressing or tanning skins, secondly, a corresponding increase in the export trade of raw skins.

Decrease of export of dressed or tanned skins. In the quinquennial period preceding the decade ending with 1910-11, the average quantity of export of dressed or tanned skins was 46,000 Bengal maunds, valued at about 41·0 lakhs of rupees per year, while during the next five year period, a considerable reduction took place, as borne out by the fact that only

18,000 Bengal maunds were exported and that for only two years valued at about 15 lakhs of rupees. A further contraction to about 8,000 maunds valued at about 9 lakhs of rupees ensued during the last quinquennial period.

Probable causes of such decline.

Foreign protective tariffs and the difficulty of tanning skins to suit foreign demand appear to be two main causes that have brought about this decline in the industry of tanning skins.

Increasing export of raw skins.

The export trade in raw skins during the same three periods rose from 68,000 to 95,000 and 1,02,000 Bengal maunds respectively.

The import of raw skins to the value of about 7 to 9 lakhs of rupees per year during the 15 years has not however been falling as might have been expected.

Production.

Allowing 40 per cent for the mortality of sheep every year and taking 37 lakhs for the average number of sheep and goats during the first half of the decade, the number of sheep and goat skins available would be 15 lakhs, which at 4 lbs. per skin raw, would yield a quantity of 74,000 Bengal maunds, whereas the quantity of exports is much greater, *i.e.*, greater number of sheep and goats must have been slaughtered or died naturally.

Trade in hides small.

The trade in hides, dressed or tanned, is very inconsiderable compared to that in skins.

That in leather unwrought large and increasing

In the case of tanned hides there has been a reversal of the balance of trade, though very small, from about 4,000 maunds of import in the first five year period to one of equal quantity of export during the last. The fact together with that of increasing export of large quantities of leather unwrought by 20 per cent during the decade 1901-02 to 1910-11 will be found to be in full accord with the expanding industry of the tanning of hides.

According to detailed information furnished in the chapter on "Tanning" about 8½ lakhs of hides are being tanned annually by the various tanneries in the State.

Value of production of hides.

Assuming the lower rate of 23 per cent for the mortality of cattle and taking 48 lakhs for the number of cattle in 1901-02 and 50 lakhs in 1910-11, the number of hides available for tanning would be about 11 lakhs in 1901-02 and 11½ lakhs in 1910-11 and this at Rs. 5 to Rs. 6 each in the mofussil, would give a money value of Rs. 60 lakhs of rupees for raw hides as bought in the interior tracts.

Total value of production of hides and skins.

The value of skins raw at Rs. 20 per Bengal maund in the mofussil would amount to between 15 and 18 lakhs of rupees, making up a total of about Rs. 75 lakhs between *hides* and *skins*.

A great deal of this quantity of production must be tanned locally by the *chamars* or *chucklers* and by the Tanneries and deducting the 8½ lakhs of hides per annum in the various big Tanneries in the State, the remainder will represent the quantity worked by the local indigenous tanner, by the Mysore Tannery and that sent by road, as for example, to Bellary from the Molakalmuru and Chellakere taluks.

The quantity of leather corresponding to 8½ lakhs of hides tanned in the Tanneries would be nearly 50,000 Bengal maunds, while the export figure is 36,000 Bengal maunds, for the first half of the decade 1901-02 to 1910-11 and 43,000 for the second, the difference being accounted for as representing local consumption. It may be remarked however that this figure is large especially so since the production of leather by the Mysore Tannery Ltd., etc., should be allowed for.

TABLE X.

Decade average values of Articles of Clothing and Dress, etc., including Jute, Hemp, Hides and Skins.

Name of articles	Imports		Exports		Remarks
	1st decade 1890-1900	2nd decade 1901-02 to 1910-11	1st deeade 1890-1900	2nd decade 1901-02 to 1910-11	
Cotton (raw)	4·0	5·14	4·0	15·4	
Cotton (manufactured) including apparel...	60·3	80·0	6·8	8·0	
Silk (raw)	...	...	18·15	35·32	
Silk (manufactured)	2·0	...	·6	·3	
Wool (raw)	·5	1·0	·7	·2	
Wool (manufactured)	3·18	2·5	7·4	6·8	
Total ...	69·98	88·6	37·6	66·0	
Other fibres (jute, hemp, etc.)... ...	6·7	6·2	1·6	2·0	
Leather wrought	2·0	·5	·6	·4	
Hides and skins (including leather unwrought)	15·6	13·13	63·0	97·12	
Total ...	94·28	108·57	102·2	165·54	

TABLE XI.

Cotton, raw and manufactured, quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Cotton (raw)	1st ...	·33	5·5	·28	4·7	
	2nd ...	·21	3·93	·52	10·86	
	3rd ...	·3	7·06	·62	14·81	
Cotton (manufactured).						
Twist and yarn (European) ...	1st ...	·12	7·39	...	·003	
	2nd ...	·12	7·36	...	...	
	3rd ...	·09	6·51	00·2	·11	
Twist yarn (Indian)	1st ...	·17	5·33	·14	4·47	For only 2 years 1908-09 and 1909-10
	2nd ...	·27	9·45	·10	3·00	
	3rd ...	·26	10·06	·14	5·39	
Piece goods (European) ...	1st ...	·34	24·77	...	·2	
	2nd ...	·4	25·62	·001	·04	
	3rd ...	·43	29·16	·003	·25	
Piece goods (Indian) ...	1st ...	·5	24·36	·06	3·06	
	2nd ...	·52	25·56	·02	1·08	
	3rd ...	·54	31·6	·04	2·09	
Others	1st ...	...	...	...	...	
	2nd ...	·02	2·23	·013	1·61	
	3rd ...	·028	2·73	·011	1·48	

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.
1st means first period 1895-96 to 1899-00.
2nd means second period 1901-02 to 1905-06.
3rd means third period 1906-07 to 1910-11.

TABLE XII.

Wool—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Wool raw	1st ...	·04	·85	·04	·83	
	2nd ...	·05	1·13	·02	·49	Exports only for two years, (1901-02 and 1902-03).
	3rd ...	·05	·80	·009	·18	
Carpets and rugs	1st ...	·0025	·25	·0032	·43	
	2nd ...	·003	·2	·003	·21	
	3rd ...	·002	·19	·005	·26	
Piece goods (European) ...	1st ...	·005	·44	...	...	
	2nd ...		Practically	nil.		
	3rd ...		Do	do.		
Piece goods (Indian) ...	1st ...	·027	3·95	·069	11·2	
	2nd ...	·003	·24	...	...	
	3rd ...	·005	·46	·004	0·31	Average for 3 years under exports.
Others	1st ...		Not	available.		
	2nd ...	·013	1·65	·06	8·19	
	3rd ...	·02	2·32	·04	4·87	

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.

1st means first period 1895-96 to 1899-00.

2nd means second period 1901-02 to 1905-06.

3rd means third period 1906-07 to 1910-11.

TABLE XIII.

Hides and skins including leather manufactured—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
(1) *Hides of cattle.*						
Dressed or tanned	1st ...	·04	1·57	·012	·44	
	2nd ...	...	...	...	...	
	3rd ...	·01	·39	·04	1·60	
Raw	1st ...	·089	1·78	·013	·25	
	2nd ...	·08	2·01	·07	1·60	
	3rd ...	·14	4·09	·09	2·38	
(2) *Skins.*						
Dressed or tanned	1st ...	·07	4·46	·46	40·90	
	2nd ...	·004	·33	·18	15·41	
	3rd ...	·007	·61	·08	8·97	
Raw	1st ...	·23	8·18	·68	32·12	
	2nd ...	·21	7·05	·95	35·81	
	3rd ...	·28	9·43	1·02	37·48	
Total	1st ...	·43	16·00	1·17	73·71	
	2nd ...	·29	9·39	1·20	52·82	
	3rd ...	·43	14·52	1·23	50·43	
Leather (unwrought)	1st ...	No	figures for	the 1st	period.	
	2nd ...	·01	·53	·36	17·86	
	3rd ...	·01	·64	·43	25·74	
Leather (manufactured)	1st ...	·01	2·15	·004	·60	
	2nd ...	·004	·72	·002	·23	
	3rd ...	·003	·35	·007	·88	

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.

1st means first period 1895-96 to 1899-00.

2nd means second period 1901-02 to 1905-06.

3rd means third period 1906-07 to 1910-11.

CHAPTER V.

ARTICLES OF BUILDING AND OTHER CONSTRUCTION.

General.

Four classes of articles are included under this head, *viz.*, *timber: manufactured* and *unmanufactured; metals* including *ores* of manganese and chrome and *ceramics; railway plant* and *rolling stock* and *stones* and *lime.*

Table XIV at the end of this chapter gives the average decade values of imports and exports for the two decades ended 1910-11, while Table XV furnishes detailed statistical information about the various sub-heads comprised under *metals and minerals*, for the three quinquennial periods ending with 1910-11.

Expansion of trade.

A reference to Table XIV shows that the trade in *articles of building and other construction* has been one of considerable expansion, under both imports and exports.

Large increase of import.

The import value increased to about 232 per cent, from an average of 28 lakhs of rupees in the first decade to about 65 in the second. This great difference is due partly to changes in classification, whereby a separate heading is assigned to *timber* in the second decade; partly also to the actual increase in the value of imports under *metals and ores*, by nearly 33 per cent, from about 24·5 lakhs to about 32·2 and lastly to the increase of imports of *railway plant*, from two lakhs worth in the first decade to nearly 9 lakhs in the second.

If 22·5 lakhs of rupees—value of *timber* imported—be excluded, the actual expansion in the import trade under *articles of building and construction* would be nearly 154 per cent.

Export small but increase great.

The export trade is much smaller than that of import but the average annual value expanded 5 to 6 fold, during the two decades, from an average of about $2\frac{1}{3}$ lakhs of rupees to one of 13.

Here again about 4 lakhs of rupees of the increase might be allowed for changes in the classification and the bulk of the remainder is due to the increasing export of ores of *manganese* and *chromium* during the second decade.

The large bulk of trade under these heads suggests a little further detailed examination.

Sub-heads under metals, etc.

The various sub-heads under *metals* and *minerals* excluding the *railway plant and rolling stock* are *brass*, and *copper, wrought and unwrought, iron and steel, metallic ores* and *others*.

Import and export.

The value of the import trade under all these heads put together rose from nearly 28 lakhs in the first period to about 32 in each of the second and third quinquennial periods, while the value of export trade increased very rapidly from about 2·6 lakhs to 4·8 and 13·7 lakhs of rupees in the three periods. The sudden and large increase is due almost entirely to the increasing exports of the *ores of manganese and chromium* from the latter part of the second quinquennial period. See Table XV.

Iron and steel form main bulk of imports

The main bulk of the value of imports is contributed by *iron and steel*, ranging from 20 to 23 lakhs of rupees, leaving a balance of about 7 to nearly 11 lakhs of rupees, which is almost equally divided between *brass, copper and others*, there being, no imports under *metallic ores.*

Brass and copper. The value of trade in *brass and copper, unwrought* is less than that in *wrought*, both under exports and imports. A considerable portion of the import and almost the whole of the export might be taken to represent the trade in *metallic vessels*, suited for the Hindu household.

Imports. The excess in the values of the average imports over those of exports, ranges from 1 to 2 lakhs of rupees in the fifteen years, under each of *brass and copper wrought*, separately. This means that there is much room for expansion of the local industry of preparing domestic vessels of *brass and copper*, required by the Mysore population.

Suggestion. Considering that workers in *brass, copper and bell-metal* have decreased in number from about 2,500 to 1,600, according to the latest Census returns the necessity is clear for immediate steps being taken to study the local industry more in detail and to organise the same on improved lines.

The reduction noticed in the quantities and values under exports of *brass and copper wrought* during the last two quinquennial periods, *i.e.*, during the decade ended 1910-11 is also in keeping with the fall in the number of local workers in brass and copper, though not in proportion.

The main bulk of the exports under *copper wrought and unwrought* might perhaps comprise old vessels, sent out of Mysore to places like Hubli, Kumbakonum etc.

Timber. The import of *timber* manufactured and unmanufactured to the extent of an annual average of about 22·5 lakhs of rupees during the decade ended 1910-11 is probably explained by the want of facilities of transport in the *malnad* areas, where growth of *timber* is luxurious and abundant. The forest tramway to Tarikere from Lakavalli and beyond, likely to be a *faite acomplii* in the near future, as well as the Arsikere Mangalore Railway line, will certainly tend to reduce the cost of Mysore *timber* and displace the imports to a greater or less extent.

Stone and Lime. The import of *stone and lime* to the extent of an average value of a lakh and a half rupees, during the two decades, suggests the desirability of a mineral country like Mysore endeavouring to supply this import; but if we remember the fact that most of this is probably due to Kadapa slabs, then there is very little to be done, unless some of the local slab stones are accepted by the local consumers in place of the Kadapa slabs. This is a point, however, which might receive a detailed enquiry.

TABLE XIV.

Decade average values in lakhs of rupees of Articles of Building and other Construction.

Name of article	Imports		Exports		Remarks
	1st decade 1890-1900	2nd decade 1901-02 to 1910-11	1st decade 1890-1900	2nd decade 1901-02 to 1910-11	
Timber (manufactured)	...	20·5	...	2·80	No separate figures available for the first decade.
Do (unmanufactured)	...	1·91	...	1·23	
Metals, minerals and ceramics (including ores of manganese and chromite ...	24·5	32·2	2·2	8·5	
Railway plant, etc.	2·0	8·6	·14	·40	
Stones and lime	1·2	1·7	...	...	
Total ...	28·0	65·0	2·34	13·0	

TABLE XV.

Metals—Quinquennial averages.

Name of article		Imports		Exports		Remarks
		Quantity	Value	Quantity	Value	
Brass (unwrought)	1st ...	·02	·74	·003	·08	
	2nd ...	·033	1·10	·01	·42	
	3rd ...	·043	1·42	·016	·52	
Brass (wrought	1st ...	·06	2·6	·015	·67	
	2nd ...	·05	2·31	·02	·95	
	3rd ...	·05	2·59	·017	·84	
Copper (unwrought) ...	1st ...	·015	·52	...	·03	
	2nd ...	·01	·37	·006	·19	
	3rd ...	·019	·79	·003	·16	
Copper (wrought)	1st ...	·03	1·02	·005	·20	
	2nd ...	·055	2·33	·009	·36	
	3rd ...	·055	2·69	·005	·28	
Total iron and steel ...	1st ...	3·26	19·44	·16	·99	
	2nd ...	3·35	23·08	·25	1·84	
	3rd ...	3·04	21·70	·27	2·17	
Metallic ores	1st ...	...	...	...	...	
	2nd ...	...	...	·82	·64	
	3rd ...	...	...	12·11	9·08	
Others	1st ...	·08	3·38	·01	·58	
	2nd ...	·07	2·64	·005	·39	
	3rd ...	·11	3·06	·022	·61	
Total ...	1st ...	3·46	27·7	·2	2·57	
	2nd ...	3·57	32·03	1·12	4·79	
	3rd ...	3·31	32·25	12·44	13·66	

Quantities in lakhs of Bengal maunds and values in lakhs of rupees.
1st means first period 1895-96 1899-00.
2nd means second period 1901-02 to 1905-06.
3rd means third period 1906-07 to 1910-11.

CHAPTER VI.

GOODS TRAFFIC AT THE VARIOUS RAILWAY STATIONS IN THE MYSORE STATE.

General.

Grouping of the railway stations in the State.

All the 77 railway stations in the Mysore State are grouped into 28 blocks and there are 159 such blocks in the whole of the Madras and Southern Mahratta Railway System. The names of the 28 groups or blocks are given in Appendix C. It could be seen therefrom that, in the Pachur-Kamasamudram block, Kamasamudram is the only station in the Mysore State, while in the Devargudda-Harihar block, Harihar alone belongs to Mysore.

Traffic statistics, sources and nature.

The Revenue Statistics of the Madras and Southern Mahratta Railway, published half-yearly, constitute the only source of figures under this head. They give the quantities of export, from every one of the 159 blocks to every one of the others in the whole system, and they do not contain detailed information. All the articles of merchandise are classed under 16 heads. Moreover, no values are given for the commodities.

How compiled.

The quantities of export under the 16 heads for any one year are collected from the two half-yearly publications for that year. The quantities sent into or received by any one station for any half-year, are obtained by summing up the proper figures under the 159 blocks. Such a compilation for a decade for all the 16 heads of articles would involve several months of special work by a large staff and I have, consequently, contented myself with obtaining the figures for only 3 years, the information being embodied in 16 statements for the 16 different sets of articles. Each statement shows the export from and import into, every one of these 28 blocks of railway stations in the State, for the three *calendar* years 1909, 1910 and 1911 and *not for official* years.

Statistics for 3 calendar years and for 16 articles.

Figures different from those of external trade by rail.

The total of all outward traffic under any one article from all the stations put together will obviously be greater than the total quantity sent out of the State, inasmuch as the former total will include also the quantities despatched to the several stations in the State itself. It could thus be seen that these figures are totally distinct from those of external railborne trade.

Purposes served by these statements.

The statements are compiled with two special objects in view, *viz.*, to give an idea of (1) the total amount of traffic in any one station, consequently of its commercial importance; and (2) of the relative importance of the several stations in the State, as regards the traffic under any one of these commodities.

Goods traffic at the Stations.

Coal and Coke.

The inwards traffic in coal and coke is much greater than that outwards, the stations at the Kolar Gold Fields receiving the largest supply, with Bangalore, Mysore and Shimoga following. The Kolar Gold Fields and the railway constitute the greatest consumers, the quantities used up by industrial establishments in the State being comparatively insignificant.

Cotton raw.

Outwards traffic in cotton is greater than that inwards, and the bulk of the export is from Davangere, most of which representing the cotton ginned at the various ginning factories there. The most important receiving stations in the State are Bangalore City and Davangere, and much of the import by rail into the latter place is evidently made up of *kapas* or seed cotton sent in, for being ginned at the ginning factories in that town, the only ginning centre in the State.

Cotton manufactured.

The inwards traffic in cotton manufactured articles is much greater than that outwards in all stations, except at Davangere, during the first two years and at Bangalore City, in the third year. The imports into the Bangalore City rank first in quantity and have been uniform at about 58,000 Bengal maunds during each of the three calendar years 1909 to 1911. These quantities comprise *twist and yarn* required for the various handlooms at the State and also *piece goods*. This import traffic shows a general rise at most of the leading stations.

Dyes and tans.

There are 6 classes of articles under this head, *viz.*, *alizarine and aniline dyes*, *cutch*, *indigo*, *myrabolams*, *turmeric and others*. All are collectively considered and no separate figures are available.

Thangadi chekke.

The outward traffic in *dyes* and *tans* is much greater than the inward traffic, except at Bangalore for the years 1910 and 1911. Most of this outward traffic is evidently made up of export trade in *thangadi chakke*, the bark of *cassia auriculata*. It is heaviest at the Bangalore Cantonment station with 1·15 lakhs, 82,000 and 86,000 Bengal maunds respectively in the three years. Considering the fact that the inwards traffic at that station for the same three years was considerably low and far less than that outwards, it follows that there must have been a very heavy cart traffic in *thangadi chakke* to the Cantonment, so as to enable such excessive exports, besides supplying the large quantities needed by 30 to 40 bark tanneries there. Other important stations exporting *thangadi chakke* are Bowringpet, with 35,000 to 83,000 Bengal maunds, Bangalore City with 12,000 to 66,000 Karadi to Gubbi from about 11,600 to 34,000, Tiptur 6,000 to 20,000, Kadur to Banavar about 7,000 to 11,000 and so on. Many of these stations thus show considerable variations in the traffic under this head, in the three calendar years 1909 to 1911.

That there is considerable trade by road in this material can be made out from the fact that the whole of the bark collected in the Kunigal and Nagamangala taluks is carted direct to Bangalore, as well as that collected in parts of the Bangalore and Tumkur districts.

It might be noticed in the statement under *dyes* and *tans*, that the total outwards from all the stations has been declining for the last 3 years, from about 4·2 lakhs to 2·4 lakhs and 2·7 lakhs respectively.

Grains and pulses.

As under *tans and dyes*, there are six classes under *grains and pulses*, *viz.*, *grain and pulse*, *jawar and bajra*, *paddy*, *rice*, *wheat and others*. The Madras and Southern Mahratta Railway returns give only collective figures under only one head.

Inward traffic in grains and pulses is greatest in Bangalore City and has varied from about 17½ lakhs in 1909 to about 11 lakhs in 1911. Bowringpet stands next with 3·25 to 1·71 lakhs of Bengal maunds. Next in order are Mysore, and Davangere.

As regards the outward traffic, Tumkur seems to lead with Mysore and Bangalore following. The export from Mysore is mostly ragi and paddy and much of the export from Tumkur probably consists of *ragi*, while the bulk of the outwards grain traffic from Davangere would consist of *cholam*.

Here again only collective figures are available and not details.

Hides and skins.

A glance at the figures under the inwards columns in the statement under *hides and skins*, Appendix C, shows that very little of that article is being received at the various railway stations in the State, excepting at about half a dozen of them. Out of the total import into the various stations, Bangalore City and Cantonment received practically the whole supply, that is 1,19,000 Bengal maunds, out of a total of 1.28,000 in 1911. Channapatna received a little over 3,000 maunds, owing to there being 2 tanneries at that place.

Inwards traffic.

Outwards traffic. The outward traffic in *hides and skins* in the various stations in the State in the year 1911 was very much greater than that inwards, excepting in the case of Bangalore City and Cantonment. Mysore City sent out by rail 25,359 maunds during 1909, 22,111, during 1910 and nearly 15,000 in 1911. Bowringpet was the greatest exporter of *hides and skins* next to Mysore, and it sent out about 15,000 maunds every year during the three years. Next in order was Shimoga with nine to eleven thousand maunds.

Contraction. The sum total of all the outward traffic in this article from the various stations in the State has contracted from about 2¼ lakhs to 1½ lakhs of maunds during the 3 years 1909-11. The exports from Mysore and Bowringpet have expanded, whereas there is a considerable fall in the export traffic from Shimoga, Kadur and Arsikere.

Provisions. *Provisions* comprise *ghee, dried fruits and nuts and others.* A reference to statement under *provisions* giving the statistics of traffic in these articles in the various stations in the State reveals the existence of two groups of stations, one group supplying more than what it gets, while the reverse obtains in the other. The stations from Holalkere up to Sivapur supply more than what they get, as well as the stations between Kadur and Gubbi. The main consuming blocks are from Bangalore to Kamasamudram on one side, Hirehalli to Tumkur, Shimoga and Chikjajur to Davangere on the other.

It may be remarked that these supplying stations are in the main cocoanut areas in the State, and that, therefore, the article exported must be composed mainly of either cocoanut or copra, one of the articles classed under *provisions*.

Suggestion.

Considerable quantities of tamarind are being exported from Bowringpet and Malur Stations—7,540 maunds from the former and about 560 maunds from the latter in the year 1912 or a little over 8,000 Bengal maunds between these 2 Stations. Whether tartaric acid could be manufactured from this and whether the quantity would be enough are points for further enquiry.

A considerable quantity of tamarind seed is being utilised to feed pigs and also for sizing of wool. Enquiries might be started to find out other uses for this seed, as the quantity avilable is fairly large.

Metals—manganese. Traffic at the various Railway Stations in the State in *metals-manganese*, etc., comprises entirely of export. *Manganese ore* is sent out from five out of the six blocks of stations, while the outwards traffic from the 6th block, *viz.*, Kadakola to Nanjangud, consisted of *chrome ore*, to the extent of about 25,000 Bengal maunds, during the Calendar year 1909. Shimoga and Maserhalli to Bidare are the greatest exporters of manganese ore, with Thalhunse to Chikjajur and Sivapur to Tarikere following. The block Karadi to Gubbi sent out the least quantities of that ore.

Metals—Others. Statistical information under traffic in metals, other than ores, is obviously incorrect as regards the figures of outward traffic from Sivapur, Mysore and Kadakola, inasmuch as the quantities of ores of *manganese* or *chromium* are included, by some mistake, in those for quantities of metals proper, other than ores.

The heavy inwards traffic at Davangere probably includes the ginning plants for the new ginning factories started during the last two or three years. Next heaviest import is at Tiptur from 8,000 to 10;000 Bengal maunds, mostly for the metal workers at *Sravanabelagola*, as well as the inwards at Settihalli, Yeliyur and French Rocks. The imports in the block Hirehalli to Yesvantapur are perhaps for *Seethakal*.

Oil-seeds. The Madras and Southern Mahratta Railway returns furnish only collective figures for all the oilseeds together and they are utilised here.

Excess of total outwards traffic in oil-seeds over that inwards increased very largely in the three years, from about 3·9 lakhs of Bengal maunds in 1909 to 5·62 in 1910 and nearly 8·0 lakhs in 1911.

Out of the various stations in the State exporting oil-seeds, Davangere is by far the most important, having contributed from 24 to 40 per cent of the total outwards at all the stations put together, in the three years 1909, 1910 and 1911.

Moreover, the exports from Davangere rose by leaps and bounds from 1·23 lakhs of Bengal maunds in 1909 to 2·5 lakhs in 1910 and to 3·52 in 1911, or the volume of outward traffic in oil-seeds at Davangere doubled and trebled in the three years ending with 1911.

Mysore City was the next greatest exporter of oil-seeds in 1911 with about 69,000 maunds, Arsikere following next with 65,000; Kengeri-Channapatna 53,000; Bangalore City nearly 49,000; Tiptur, Tumkur and Bowringpet, a little over 40,000 each; French Rocks, Krishnarajapuram and the stations between Ramgiri and Ajjampur following in order. Bangalore is the greatest importer with about 50,000 Bengal maunds; Mysore City follows with about 115,00 Bengal maunds.

Oils.

At every station in the Mysore State, the export traffic in oils is considerably less than that of import. The difference between the total outwards and the total inwards in the various stations gives a sum of about 3,75,143 maunds of import or inwards, for 1911 and this figure agrees very closely with that of total external import, *viz.*, 365,781 Bengal maunds in the year 1910-11. Nearly $\frac{1}{3}$ of the total of the inward traffic falls to the share of Bangalore City, while that in Cantonment is about $\frac{1}{10}$ of that of Bangalore City. Mysore received the next greatest supply of 54,400 maunds, Davangere 44,700, Arsikere 37,600 and Nanjangud 23,000.

It may be noted that the total inwards traffic at all the stations together has been pretty constant at an average of nearly 4·5 lakhs of Bengal maunds in the three years and this might be expected, as most of the traffic is in kerosine oil. The total outwards traffic in oil is only $\frac{1}{4}$ to $\frac{1}{5}$ of that inwards.

Bangalore is the most important exporter of oils and the increase in traffic is an indication of the increasing activity of the few oil presses and this might continue, with the development of the oil pressing concerns by adding rotary oil mills in one of them.

The rapidly increasing export of oil-seeds and the steady import of oils are matters for note and action in the shape of detailed enquiries.

Salt.

Traffic in Salt has been one of import at every station, with a total for all stations of about 7 to $7\frac{3}{4}$ lakhs of Bengal maunds. The only station showing a decent outward traffic is Tumkur from about 13,000 to 10,000 Bengal maunds in the three years. A large proportion of this is probably represented by earth-salt produced in parts of the district and utilised in salting hides and skins and for domestic consumption by the poorer classes.

Spices.

Spices comprise, *arecanut*, *pepper*, *cordamoms*, *chillies*, and *others*. Only total figures of traffic in these articles are published by the Madras and Southern Mahratta Revenue Statistics and these are compiled for three Calendar years 1909 to 1911.

A glance at the statement under spices in Appendix C shows that the trade in spices is fairly heavy at 2·3 to 2·5 lakhs of Bengal maunds, representing the total inwards at all the stations in the State, while the total outwards ranges from $2\frac{1}{3}$ to $3\frac{1}{4}$ lakhs of Bengal maunds, for all the stations together.

As might be expected, the outwards traffic in spices is greatest at Birur, Shimoga, Arsikere, Ramgiri—Ajjampur, besides at Bangalore City. The outwards traffic in Birur shows a decline in the three years from about 78,000

Bengal maunds in 1909 to nearly 64,000 in 1911, while Shimoga has been showing a steady rise from about 68,000 to nearly 86,000 Bengal maunds in the same period. These two stations between themselves sent out from 1·4 to 1·5 lakhs of Bengal maunds or nearly 65 per cent of the total outwards. Arsikere has also been sending from 30,000 to 60,000 Bengal maunds; nearly 80 per cent of the outwards traffic is taken up by these three stations, while Bangalore City has been sending out about 21,000 Bengal maunds. Almost the whole of the traffic from Birur, Shimoga and Arsikere must be confined to *areca*.

The inwards traffic is greatest in the Bangalore City from 75,000 to nearly 2 lakhs of Bengal maunds. Bowringpet ranks second, at an average of about 32,000 Bengal maunds. Mysore follows, though the traffic has declined from about 27,000 to nearly 19,000 Bengal maunds in the three years. Bangalore Cantonment, Birur, Arsikere, Karadi,—Gubbi, Davangere, Tumkur, Kengeri—Channapatna follow in order, in the inwards traffic. Some proportion of the export from Ramgiri—Ajjampur ought to include *coriander*.

Sugar. Bangalore City is the most important centre of railborne traffic in sugar in the Mysore State. The traffic is greatest both ways, inwards and outwards.

Outwards. Exports from Bangalore City constituted 25 to 34 per cent of the total at all the stations and increased to 250 per cent from about 63,000 Bengal maunds in 1909 to 153,000 and 150,000 Bengal maunds in 1910 and 1911.

Stations comprised in the block Dodkurgod to Yelahanka constituted the next greatest exporters, with nearly 72,000, 75,000 and 118,000 Bengal maunds in the three years. Here again, an increase in exports is noticeable. This would include some of the production from the Goribidnur factory. Bowringpet sent out about 51,500, 60,000 and 45,000 Bengal maunds and Tiptur despatched from nearly 16,000 to 69,000 in the same period.

The rapid and large rise in export of jaggery and sugar from these stations is a point for note.

Inwards. Bangalore City had the lion's share of imports ranging from 40 to 60 per cent of the total of the imports at all the 77 stations together.

The imports were greatly in excess of the exports, though the difference tended to diminish in the three years.

Dodkurgod* to Yelahanka follow next. Other important importing stations are Davangere, Mysore, Bowringpet, Shimoga and Tumkur, etc.

Wood. During the year 1911, 17·2 lakhs of Bengal maunds of wood were received in all the stations put together and 13·16 lakhs sent out, leaving a balance of about 4,03,559.

Inwards. Of the 17 and odd lakhs sent into the stations in 1911, over 4 lakhs were received by the Bangalore City and about 1·1 lakhs by the Bangalore Cantonment; about 9 lakhs by the stations of the Kolar Gold Fields; about 82,000 by the Davangere station; 31,000 by Mysore; 32,000 by Pachur-Kamasamudram, besides, 28,000 by Bowringpet.

Outwards. The most important forwarding stations for wood are Tyakal to Krishnarajapur, with 2·82 lakhs in 1911; Mysore 2 lakhs; Shimoga about 1·55; Tarikere about 73,000; Channapatna 75,000 and Dodkurgod to Yelahanka 83,000.

It may be remarked that the total inwards is greater than the total outwards, though this excess shows a tendency to decreases, as the figures for the three years indicate.

* Goribidnur received in 1912 about 93,000 Bengal maunds of jaggery, for the factory and others.

CHAPTER VII.

EXTERNAL TRADE BY ROAD.

No reliable or complete figures are available regarding the volume of the external trade carried on by road,

About forty border points.

There are about 40 points all round the State for egress and ingress of articles of merchandise from or into the State to or from the borders of the two Presidencies of Madras and Bombay, encircling the Province. The toll gates at most of these points merely record the number of carts to and from, classifying them merely as loaded or unloaded, for the purposes of toll collection.

Some important *Ghats.*

Some information is, however, available in the case of the important Ghat roads leading to South Canara. The toll register at Agumbe, Tirthahalli Taluk, gives some details of the nature of the articles and quantities, while the information from the two toll gate registers at Marnhalli and Bisle Ghats, is very meagre. It must be remembered that Agumbe and Marnhalli are two important points of exit through which, a large proportion of the coffee produced in this State is exported.

Bisle Ghat.

Loaded carts up and down.

The Bisle Ghat toll returns show the number of loaded carts that went down into South Canara as 328 in 1909-10, (The traffic in these Ghats is from November to May), 305 carts in 1910-11 and 317 in 1912-13. 208, 189 and 131 loaded carts came up from below, during the same three years.

Those Unloaded.

The number of empty carts that went down is comparatively small, 69 being the greatest in the year 1911-12; those coming up were 167,195 and 262 respectively.

Whether these latter carried coffee or paddy is not known.

There are also a few cattle loads, etc. But the number is comparatively insignificant, amounting to not more than 88 in any year.

Heavy cattle traffic. Outwards.

About 1805 cattle were taken down during 1909-10, the number having increased to 3,365 during the next year and to 4,776 during 1911-12, while during one month alone, November 1912-13, over 9,000 cattle are shewn as having been sent out from Mysore to South Canara.

That inwards small.

The cattle traffic *into* the State during the same period was comparatively insignificant, having been 249, 392 and 262 during the three years respectively. During 1912-13 the inwadrs amounted to 1,400 for the two months of November and December. November seems to be the month for most of this cattle traffic. The statement, as compiled from the vernacular papers, is appended hereto. Appendix D, Table I.

Agumbe Ghat.

Four tabulated statements of the road traffic at Agumbe are appended, Appendix D, Table II, two relating to the imports into the State and the other two to the exports to South Canara.

Items of cart traffic inwards. Salt, manure, fish, tiles, cocoanuts and oils.

During the 18 months from 1908 to the end of June 1909, 1,839 empty and 10,600 loaded, carts went up the ghats besides 600 heads of cattle. 2,900 cart loads of salt, 2,148 of manure and 583 of fish were brought into Mysore during the same period, both for manurial purposes and for consumption in the coffee estates. 1,643 cart loads of tiles numbering about 4,11,000, 170 of cocoanuts and 547 full of oil were brought into Mysore during the 18 months.

Outwards: coffee, paddy, jaggery and sandal-wood.

The principal items of down-ward traffic were paddy, coffee, jaggery and sandal. The quantity of sandal sent down to South Canara during the 18 months amounted to 489 cart loads. Assuming that a cart load is half a ton, the quantity exported during the period would amount to about 245 tons of a value of about 2½ lakhs of rupees, according to the latest auction prices. Another valuable item which is sent to Mangalore through this Ghat is coffee. About 2,620 cart loads of coffee valued at about 15½ lakhs of rupees were exported, 1,717 cart loads during 1908 and 903 in the first 6 months of 1909. January, February and March are the three months when the downward traffic in coffee is greatest.

The downward traffic under paddy is greatest in the first 2 months of every year and practically none from June to November. 3,634 cart loads were sent into South Canara in the year 1908 and 1,451 in the first 6 months of the next year.

The downward traffic in jaggery is the greatest during the quarter of the year from April to June and the total quantity amounted to about 500 cart loads in 1908 and to about 320 in the 6 months following. Export of cattle during 1908 was over 3,836 and nearly 1,640 in the first 6 months of 1909. The number of sheep sent down to South Canara through the Agumbe Ghat amounted 2,600 during the 18 months.

Export of cattle and sheep.

Marnhalli Ghat.

A statement is appended shewing the amount of traffic passing through the Marnhalli Ghat in the Saklespur taluk of the Hassan District. The most important articles which pass down by this Ghat from Mysore into South Canara are coffee, paddy and jaggery, while the upward traffic into the Mysore State, is mostly, tiles, manure and salt. No detailed information is available from 1907-08 to 1909-10, but only the number of carts going up or down, loaded or unloaded.

The number of loaded carts that went down was 4,150 in 1907-08 and 1,915 and 1,408 and 3,089 respectively during the succeeding years. The number of carts that were going up were 1,872, 1,402, 864, and 1,922 respectively for the four years. There has been a steady decline in the export of cattle by this Ghat, as will be seen from the figures given below, for the five years, *(viz)* 4,545, 3,772, 1,291, 1,299 and 720 respectively.

A more detailed statement was furnished for 1910-11 and 1911-12 and it is seen that the export of coffee by this Ghat rose from 1,102 cart loads in 1910-11 to 1,428 in 1911-12. Taking Rs. 600 as about the value of the cart load at the present rates, the quantity sent down will amount to Rs. 6,61,200 by the Marnhalli Ghat for 1910-11 and Rs. 8,56,800 for 1911-12.

The export of paddy was reduced to nearly 50 per cent in the two years of 1910-11 and 1911-12 from 1,551 to 848 cart loads, whereas the export of provisions rose from 177 to 443 cart loads. In the case of jaggery the quantity sent down or up was very trifling. Soapnut is being sent down through the Ghats and the quantity was only 47 cart loads in 1910-11 and 67 in 1911-12. Sandal is another item of export and it was 29 and 76 carts respectively in those two years. The import of manure through this Ghat rose from 381 to 601 cart loads during the two years, while the tiles brought from Mangalore decreased from 457 cart loads of 114,000 tiles to 272 cart loads of 68,000 tiles. The quantity of fish sent up was rather very insignificant, being nearly 4 to 10 cart loads in two years. Salt fell down from 651 carts to 323 in 1910-11. The traffic in tobacco is only upward. The lime required for the coffee plantations, sent up through this Ghat, fell from 46 cart loads to 37 in the last two years.

Road Traffic, *via.*, Chamarajnagar.

Export of cattle constitutes the most important item of outward road traffic passing through Chamarajnagar to Satyamangalam. There is a net work of cattle agency in the eastern half of the Mysore district, for buying cattle for export. According to local information, about half a lakh of rupees worth of cattle are being sent away to Satyamangalam every week. Santemarahalli is one of the most important cattle marts in this part of the Province and it is here that purchases are made on a large scale. This cattle export is a serious point and requires detailed investigation and verification.

Considerable quantities of different kinds of mats in several cart loads are sent every week out of Chamarajnagar, each cart having about 800 mats of 3′×3′.

Jingili seed is another article of export along this road, besides paddy, cholam, etc.

Large quantities of tobacco, chillies, cloth, groundnuts, oils, paddy and indigo are sent every week from the Satyamangalam side.

APPENDIX A.

TRANSFRONTIER RAILBORNE TRAFFIC, 1890-91 TO 1910-11.

Animals.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·013	·011	·44	·47	1901-02	·01	·043	·64	·544
1891-92	·021	·019	.68	·58	1902-03	·151	·033	1·42	·5
1892-93	·021	·010	·57	·44	1903-04	·166	·007	1·83	·69
1893-94	·018	·010	·62	·57	1904-05	·16	·129	1·47	1·26
1894-95	·020	·011	·75	·54	1905-06	·283	·126	2·18	1·5
1895-96	·048	·017	1·26	·68	1906-07	·417	·104	3·03	1·2
1896-97	·048	·015	1·31	·88	1907-08	·478	·084	2·52	1·03
1897-98	·069	·016	1·66	·82	1908-09	·3	·18	1·41	1·1
1898-99	·098	·016	1·47	·78	1909-10	·502	·391	3·94	2·62
1899-00	·167	·015	1·81	·61	1910-11	·425	·291	2·71	2·2
Average for 10 years	·05	·01	1·06	·64	Average for 10 years	·289	·138	2·11	1·264

Coal and Coke.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	4·85	...	4·54	...	1901-02	27·75	·04	18·13	·02
1891-92	9·10	·01	11·37	0·1	1902-03	28·23	...	20·37	...
1892-93	15·56	...	17·50	...	1903-04	26·08	...	16·60	...
1893-94	18·65	...	13·98	...	1904-05	24·50	...	15·81	...
1894-95	22·30	·22	15·33	·15	1905-06	11·01	...	6·55	...
1895-96	26·58	·06	19·94	·04	1906-07	20·96	...	12·67	...
1896-97	29·02	·02	21·76	·01	1907-08	21·98	...	14·23	...
1897-98	31·74	·05	23·80	·03	1908-09	18·59	...	14·95	...
1898-99	42·45	·02	31·84	·01	1909-10	3·04	...	1·83	...
1899-00	40·89	·04	33·23	·04	1910-11	1·88	...	1·03	...
Average for 10 years	24·11	·04	19·33	·03	Average for 10 yoars	18·33	...	13·22	...

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Cotton, raw.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·058	·088	·972	1·471	1901-02	·25	·09	4·56	1·59
1891-92	·133	·315	2·119	4·940	1902-03	·15	·27	2·54	5·07
1892-93	·150	·089	2·422	1·420	1903-04	·07	·49	1·45	9·32
1893-94	·172	·133	3·070	2·374	1904-05	·15	1·35	2·75	30·41
1894-95	·222	·352	3·867	6·257	1905-06	·44	·99	8·54	19·15
1895-96	·199	·321	3·478	5·712	1906-07	·32	·74	5·94	14·95
1896-97	·404	·285	6·958	5·183	1907-08	·19	1·52	4·09	31·49
1897-98	·558	·189	9·229	3·242	1908-09	·39	·58	6·58	10·14
1898-99	·309	·334	4·491	4·929	1909-10	·33	·70	8·13	14·62
1899-00	·188	·265	3·365	4·638	1910-11	·29	·72	6·88	17·05
Average for 10 years	·24	·23	3·99	4·0	Average for 10 years	·25	·74	5·14	15·37

Cotton, manufactured.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	1·03	·25	61·50	8·55	1901-02	1·13	·109	58·41	4·34
1891-92	·97	·12	57·90	4·43	1902-03	1·30	·13	67·84	5·99
1892-93	1·03	·17	59·89	6·68	1903-04	1·26	·02	65·89	2·48
1893-94	1·05	·10	54·90	3·83	1904-05	1·42	·11	76·53	6·32
1894-95	1·12	·14	59·72	5·72	1905,06	1·51	·18	82·42	8·33
1895-96	1·11	·24	61·32	9·35	1906-07	1·34	·17	77·72	8·28
1896-97	1·15	·20	63·54	8·15	1907-08	1·48	·21	86·14	10·05
1897-98	1·20	·22	65·23	8·26	1908-09	1·50	·174	87·40	8·73
1898-99	·97	·15	51·89	5·74	1909-00	1·23	·20	73·81	9·42
1899-00	1·27	·21	67·19	7·34	1910-11	1·25	·18	75·25	8·32
Average for 10 years	1·09	·18	60·30	6·80	Average for 10 years	1·34	·14	75·14	7·22

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Drugs and Chemicals.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·055	·016	1·458	1·008	1901-02	·254	·06	12·32	1·62
1891-92	·078	·016	3·329	·789	1902-03	·16	·04	7·31	1·66
1892-93	·062	·014	3·481	1·064	1903-04	·184	·03	9·53	1·47
1893-94	·102	·013	7·901	·836	1904-05	·22	·057	19·65	2·34
1894-95	·117	·018	7·810	1·129	1905-06	·21	·041	13·88	2·43
1895-96	·102	·014	4·700	·683	1906-07	·27	·026	15·97	3·32
1896-97	·111	·018	4·893	·723	1907-08	·21	·016	15·02	2·71
1897-98	·149	·023	7·187	1·027	1908-09	·22	·03	16·32	7·36
1898-99	·162	·020	7·484	·666	1909-10	·24	·04	14·23	5·90
1899-00	·209	·039	9·975	1·742	1910-11	·21	·02	11·93	2·97
Average for 10 years	·11	·01	5·82	·96	Average for 10 years	·211	·035	13·61	3·17

Dyes and Tans.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·134	·58	1·69	4·77	1901-02	·314	·933	4·04	2·01
1891-92	·20	·55	1·91	4·94	1902-03	·32	1·16	·92	2·83
1892-93	·20	·60	2·83	5·34	1903-04	·22	·89	·75	1·74
1893-94	·13	·57	2·11	5·82	1904-05	·168	1·06	1·17	2·11
1894-95	·26	1·06	4·82	17·11	1905-06	·354	1·47	1·86	3·19
1895-96	·29	·84	4·03	9·38	1906-07	·65	1·92	3·03	4·64
1896-97	·49	·60	4·92	4·52	1907-08	·512	1·72	3·09	6·23
1897-98	·47	1·35	4·35	11·67	1908-09	·473	2·18	3·08	5·80
1898-99	·40	1·20	3·73	8·78	1909-10	·211	1·95	2·39	5·11
1899-00	·59	1·18	5·31	7·64	1910-11	·154	1·74	1·89	4·56
Average for 10 years	·31	·85	3·57	7·99	Average for 10 years	·337	1·502	2·22	3·82

Quantity in lakhs of Bengal maunds and values in lakhs of rupees.

APPENDIX A—*contd.*

Grain and Pulse—Gram and Pulse.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·714	1·189	1·671	2·679	1901-02	2·93	·36	10·87	1·21
1891-92	1·147	1·128	2·951	2·844	1902-03	1·31	2·14	4·10	7·58
1892-93	1·589	1·170	4·807	3·511	1903-04	2·30	·72	6·82	2·26
1893-94	1·758	1·328	4·131	2·759	1904-05	3·15	·24	8·50	·66
1894-95	·804	2·197	1·938	5·229	1905-06	2·07	·93	6·38	2·96
1895-96	1·216	2·724	2·990	6·508	1906-07	1·63	·72	5·85	2·63
1896-97	1·373	1·549	4·060	5·110	1907-08	1·86	1·67	6·90	6·64
1897-98	2·368	2·747	9·873	13·238	1908-09	2·42	1·22	11·11	5·37
1898-99	2·027	·679	6·021	1·963	1909-10	3·43	1·13	13·21	4·42
1899-00	1·306	2·497	4·131	9·012	1910-11	2·57	1·94	8·34	6·16
Average for 10 years	1·43	1·72	4·25	5·28	Average for 10 years	2·36	1·10	8·20	3·98

Grain and Pulse—Jawar and Bajra.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·002	3·30	...	7·34	1901-02	·004	3·92	·01	11·14
1891-92	·01	2·43	·02	5·63	1902-03	...	2·77	...	8·27
1892-93	.13	4·82	·32	11·30	1903-04	...	·65	...	1·34
1893-94	·06	6·15	·15	13·47	1904-05	...	1·45	...	3·39
1894-95	·021	1·69	·04	3·93	1905-06	·04	4·14	·10	12·47
1895-96	·07	2·52	·12	5·58	1906-07	·07	1·41	·24	4·57
1896-97	·06	7·78	·13	23·21	1907-08	·05	2·17	·14	6·96
1897-98	·33	7·58	·93	28·86	1908-09	1·05	2·69	3·73	9·83
1898-99	·02	2·29	·05	5·36	1909-10	1·82	·67	5·91	2·10
1899-00	·13	5·35	·35	18·33	1910-11	·10	1·26	·31	3·87
Average for 10 years	·084	4·39	·21	12·36	Average for 10 years	.313	2·11	1·04	6·39

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Grain and Pulse—Rice in the husk.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·005	4·225	·011	8·979	1901-02	·11	·39	·30	·99
1891-92	·725	1·185	1·631	2·666	1902-03	...	1·49	...	3·19
1892-93	·045	5·004	·113	12·510	1903-04	·10	1·76	·21	3·62
1893-94	·120	7·251	·241	14·504	1904-05	·24	2·75	·51	5·98
1894-95	·272	2·790	·510	5·237	1905-06	·07	1·12	·17	2·63
1895-96	·131	1·061	·229	1·856	1906-07	...	1·53	...	4·16
1896-97	·259	·796	·502	1·557	1907-08	...	6·49	...	19·15
1897-98	·012	1·592	·033	4·312	1908-09	·34	3·29	1·24	11·13
1898-99	·191	2·367	·427	5·180	1909-10	·23	1·11	·67	3·04
1899-00	·145	1·201	·308	2·706	1910-11	·04	3·81	·12	10·15
Average for 10 years	·19	2·74	·40	5·95	Average for 10 years	·11	2·37	·32	6·40

Grain and Pulse—Rice not in the husk.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	2·19	·10	7·79	·36	1901-02	7·00	·04	28·66	·18
1891-92	5·97	·02	24·08	·10	1902-03	6·14	·07	21·00	·25
1892-93	4·13	·05	17·14	·22	1903-04	6·27	·30	20·75	1·38
1893-94	2·93	·11	9·61	·39	1904-05	6·42	·11	22·19	·43
1894-95	4·65	·08	14·54	·36	1905-06	8·67	...	34·62	...
1895-96	6·52	·03	19·60	·09	1906-07	8·59	·17	38·00	·77
1896-97	5·70	·28	19·34	1·24	1907-08	5·00	·20	23·97	1·07
1897-98	4·59	·71	19·22	3·79	1908-09	11·12	·14	59·85	·73
1898-99	5·22	·03	19·17	·15	1909-10	14·26	·06	65·78	·30
1899-00	6·82	·13	24·84	·64	1910-11	7·84	·07	33·24	·29
Average for 10 years	4·87	·15	17·53	·73	Average for 10 yoars	8·13	·11	34·80	·54

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd*,

Grain and Pulse—Wheat.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·950	·023	3·073	·091	1901-02	·40	·004	1·92	·02
1891-92	·944	·015	3·768	·067	1902-03	·40	...	1·71	...
1892-93	·767	·012	3·100	·058	1903-04	·57	...	2·03	...
1893-94	·766	·015	2·553	·065	1904-05	·66	...	2·28	...
1894-95	1·124	·045	3·242	·143	1905-06	·77	...	3·02	...
1895-96	1·084	·082	2·994	·230	1906-07	·65	...	2·77	...
1896-97	·589	·035	2·468	·146	1907-08	·90	...	4·35	...
1897-98	·655	·029	3·594	·172	1908-09	·90	...	5·06	...
1898-99	·598	·011	2·391	·049	1909-10	·69	...	3·54	...
1899-00	·687	·057	3·12	·247	1910-11	·80	...	3·72	...
Average for 10 years	·81	·032	3·03	·12	Average for 10 years	·67	...	3·04	...

Grain and Pulse—Others.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·03	18·99	·08	47·85	1901-02	·53	3·95	1·43	11·05
1891-92	·05	15·35	·15	46·03	1902-03	·57	2·87	1·02	5·84
1892-93	·72	13·24	1·98	36·44	1903-04	·38	4·21	·57	7·44
1893-94	·85	19·16	1·55	34·23	1904-05	·17	6·89	·32	13·63
1894-95	·33	10·48	·53	15·62	1905-06	·18	9·34	·43	22·21
1895-96	·14	7·69	·25	10·85	1906-07	·19	5·77	·53	15·96
1896-97	·18	8·86	·38	14·72	1907-08	·15	5·95	·40	16·23
1897-98	·19	23·23	·39	56·10	1908-09	1·36	4·42	4·07	13·56
1898-99	·48	8·79	·96	16·88	1909-00	1·36	1·17	3·82	3·06
1899-00	·54	3·68	1·10	8·19	1910-11	·10	3·38	·25	8·73
Average for 10 years	·34	12·9	·73	28·69	Average for 10 years	·49	4·79	1·28	11·77

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Grain and Pulse*—Total of all kinds, including *wheat flour*.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	3·895	27·837	12·628	67·302	1901-02	11·604	8·66	47·04	24·59
1891-92	8·853	20·130	32·610	57·355	1902-03	8·97	9·36	30·61	25·34
1892-93	7·376	24·305	27·470	64·057	1903-04	10·42	7·67	34·33	16·23
1893-94	6·490	34·028	18·244	65·426	1904-05	11·40	11·47	37·76	24·30
1894-95	7·195	17·297	20·801	30·525	1905-06	12·62	15·58	48·86	40·64
1895-96	9·175	14·110	26·187	25·128	1906-07	12·07	9·65	52·24	28·49
1896-97	8·169	19·300	26·875	45·982	1907-08	8·82	16·53	40·78	50·44
1897-98	8·154	35·890	34·046	106·479	1908-09	18·12	11·81	91·11	41·01
1898-99	8·539	14·173	29·018	29·588	1909-10	22·65	4·18	98·33	13·20
1899-00	9·636	12·918	33·857	39·633	1910-11	12·36	10·49	51·11	29·49
Average for 10 years	7·74	22·19	26·17	53·15	Average for 10 years	12·90	10·54	53·21	29·37

Hides and Skins, including *leather unwrought*.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	(*a*) Exports
1890-91	·436	·693	16·045	44·028	1901-02	·17	1·15	5·16	73·97
1891-92	·458	·847	14·703	52·577	1902-03	·19	1·13	6·35	64·62
1892-93	·355	·944	12·970	54·292	1903-04	·24	1·34	6·67	78·47
1893-94	·353	·822	13·030	49·924	1904-05	·32	1·51	11·44	91·99
1894-95	·551	1·027	19·546	58·924	1905-06	·63	2·16	20·28	132·25
1895-96	·472	1·163	18·011	66·027	1906-07	·40	2·13	14·08	135·76
1896-97	·605	1·131	20·648	68·900	1907-08	·35	1·30	13·97	92·00
1897-98	·563	1·200	20·725	82·285	1908-09	·44	1·77	16·17	115·90
1898-99	·225	1·097	8·604	71·836	1909-10	·34	1·65	12·30	122·64
1899-00	·318	1·253	11·887	79·511	1910-11	·70	1·38	24·91	63·62
Average for 10 years	·43	1·01	15·61	62·93	Average for 10 years	0·38	1·54	13·13	97·12

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

* The totals of *grain and pulse* in Table II include figures under *wheat flour*.

(*a*) There is a considerable difference between the export value in 1910-11 and those of the years previous. This is explained as being due to very high rates assigned prior to 1910-11, for leather unwrought.

I have however, taken the figures given at the end of "External Trade of the Mysore State" published in 1913 and have not allowed for such differences in rates.

APPENDIX A—*contd.*

Horns.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	...	·02	·018	·28	1901-02	...	·01	...	·07
1891-92	·001	·03	·014	·42	1902-03	...	·03	...	·39
1892-93	·001	·02	·016	·35	1903-04	...	·01	...	·19
1893-94	...	·01	·009	·23	1904-05	...	·02	...	·43
1894-95	...	·01	·012	·17	1905-06	...	·04	...	·71
1895-96	·001	·01	·009	·22	1906-07	·02	·07	·33	1·13
1896-97	·0016	·01	·026	·23	1907-08	...	·04	...	·55
1897-98	·0005	·01	·009	·20	1908-09	...	·05	...	·67
1898-99	·0016	·02	·023	·27	1909-10	...	·05	...	·77
1899-00	·0004	·02	·007	·35	1910-11	...	·04	...	·57
Average for 10 years	·0009	·017	·014	·27	Average for 10 years	...	·03	...	·54

Hemp and other Fibres.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	...	...	...	...	1901-02	·02	·04	·10	·34
1891-92	...	...	...	...	1902-03	·03	·04	·14	·31
1892-93	...	...	...	...	1903-04	·02	·05	·17	·44
1893-94	...	...	...	...	1904-05	·02	·03	·17	·24
1894-95	...	...	...	...	1906-06	·02	·02	·32	·16
1895-96	...	...	...	...	1906-07	·02	·05	·33	·64
1896-97	·011	·019	·063	·16	1907-08	·03	·06	·32	·57
1897-98	·019	·049	·087	·32	1908-09	·02	·06	·34	·31
1898-99	·009	·064	·037	·39	1909-10	·03	·07	·45	·69
1899-00	·008	·062	·044	·45	1910-11	·03	·06	·50	·58
Average for 4 years	·012	·05	·06	·33	Average for 10 years	·02	·04	·28	·42

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Jute.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·67	·08	7·16	·82	1901-02	·43	·11	4·85	1·33
1891-92	·50	·09	5·43	·92	1902-03	·54	·11	6·02	1·32
1892-93	·59	·08	6·06	·85	1903-04	·48	·11	7·60	1·32
1893-94	·77	·10	10·06	1·23	1904-05	·53	·11	5·93	1·24
1894-95	·55	·10	6·53	1·24	1905-06	·55	·14	6·03	1·53
1895-96	·55	·11	6·84	1·40	1906-07	·43	·14	4·68	1·57
1896-97	·65	·13	6·68	1·42	1907-08	·59	·15	7·39	1·73
1897-98	·83	·13	8·10	1·27	1908-09	·42	·15	5·27	1·92
1898-99	·43	·14	4·83	·158	1909-10	·40	·17	4·71	2·00
1899-00	·46	·14	4·83	1·51	1910-11	·52	·14	6·53	1·75
Average for 10 years	·60	·11	6·65	1·22	Average for 10 years	·48	·13	5·90	1·57

Lac.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	...	...	·015	·053	1901-02	...	·01	...	·20
1891-92	...	...	·016	·012	1902-03	...	·006	...	·23
1892-93	...	...	·018	·083	1903-04	...	·003	...	·20
1893-94	...	...	·029	·113	1904-05	...	...	...	...
1894-95	...	...	·022	·069	1906-06	...	...	...	...
1895-96	...	...	·012	·057	1906-07	...	...	...	...
1896-97	...	...	·023	·031	1907-08	...	...	...	...
1897-98	...	...	·041	·019	1908-09	...	...	...	...
1898-99	...	...	·029	·012	1909-10	...	...	...	...
1899-00	...	...	...	...	1910-11	·002	...	·18	...
Average for 10 years	...	...	0·02	·049					

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Leather, wrought (excluding boots and shoes).

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·01	·002	1·47	·34	1901-02	·002	(23)	·99	·06
1891-92	·01	·007	·83	·87	1902-03	·001	...	·18	...
1892-93	·01	·006	1·55	·75	1903-04	·006	·003	·79	·32
1893-94	·01	·003	2·31	·50	1904-05	·005	·002	·81	·31
1894-95	·02	·003	2·36	·57	1905-06	·007	...	·84	...
1895-96	·01	·003	2·02	·44	1906-07	·005	·003	·64	·31
1896-97	·01	·005	2·64	1·00	1907-08	·004	·003	·47	·35
1897-98	·01	·003	2·42	·65	1908-09	·003	·001	·36	·34
1898-99	·01	·001	2·12	·31	1909-10	·001	·02	·10	2·52
1899-00	·01	·005	2·19	·92	1910-11	·001	...	·16	...
Average for 10 years	·013	·004	1·99	·64	Average for 10 years	·003	·003	·53	·42

Liquors.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·342	·009	14·527	·496	1901-02	·37	·12	14·83	·37
1891-92	·354	·006	17·854	·231	1902-03	·45	·13	17·48	1·14
1892-93	.719	·003	51·212	·190	1903-04	·46	·12	17·69	1·97
1893-94	·432	·009	23·302	·248	1904-05	·45	·152	17·68	3·18
1894-95	·464	·013	19·780	·389	1905-06	·47	·13	16·94	3·66
1895-96	·501	·113	21·714	9·295	1906-07	·44	·195	16·44	4·94
1896-97	·434	·161	22·625	·401	1907-08	·39	·262	16·13	5·29
1897-98	·393	·058	23·794	1·033	1908-09	·33	·15	12·85	3·56
1898-99	·431	·101	25·239	·532	1909-10	·31	·132	11·85	3·31
1899-00	·409	·054	19·069	·329	1910-11	·29	·14	11·49	3·53
Average for 10 years	·45	·042	23·91	1·31	Average for 10 years	·37	·153	15·33	3·09

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Metals.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	2·33	·17	19·61	1·80	1901-02	3·96	3·26	44·14	2·79
1891-92	2·45	·09	17·93	1·40	1902-03	3·19	·174	28·73	3·44
1892-93	2·66	·13	21·63	1·79	1903-04	3·50	·124	29·83	2·47
1893-94	3·25	·21	24·94	1·96	1904-05	4·14	·197	33·88	3·80
1894-95	2·67	·22	22·52	2·39	1905-06	3·18	·318	23·88	4·51
1895-96	4·44	·22	31·97	2·80	1906-07	2·873	13·871	28·29	14·67
1896-97	3·06	·24	24·09	2·72	1907-08	3·94	20·182	39·13	21·54
1897-98	4·28	·22	36·92	2·74	1908-09	3·54	12·296	33·64	14·18
1898-99	3·10	·16	25·29	2·21	1909-10	3·12	6·288	30·28	8·95
1899-00	2·49	·16	20·33	2·36	1910-11	3·15	8·445	30·20	8·94
Average for 10 years	3·07	·18	24·52	2·21	Average for 10 years	3·459	6·61	32·21	8·52

Oils.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·771	·035	4·902	·468	1901-02	2·07	·05	12·16	·61
1891-92	·806	·202	6·029	2·658	1902-03	1·94	·04	11·28	·46
1892-93	1·191	·057	7·647	·776	1903-04	2·25	...	13·66	...
1893-94	1·162	·231	6·018	3·046	1904-05	2·60	·12	15·52	·78
1894-95	1·132	·236	6·639	2·747	1905-06	2·60	·10	16·63	·91
1895-96	1·199	·224	7·950	2·739	1906-07	2·94	·08	19·49	1·10
1896-97	1·276	·138	8·523	1·739	1907-08	3·08	·06	20·17	1·23
1897-98	1·862	·090	10·906	1·092	1908-09	3·38	·105	23·05	1·29
1898-99	1·748	·054	10·881	·589	1909-10	3·22	·12	22·44	1·38
1899-00	1·729	·076	12·057	·760	1910-11	3·65	·08	26·04	1·06
Average for 10 years	1·28	·13	8·15	1·66	Average for 10 years	2·77	·075	18·04	·88

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Oil-seeds.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·29	2·10	2·14	11·27	1901-02	·533	3·70	2·00	19·69
1891-92	·90	1·28	4·97	7·52	1902-03	·35	5·57	1·39	28·61
1892-93	·30	3·81	2·06	16·28	1903-04	·27	5·86	1·01	24·91
1893-94	·20	4·01	1·40	21·31	1904-05	·28	4·06	·98	17·63
1894-95	·24	5·28	1·16	24·71	1905-06	·39	2·85	1·52	17·33
1895-96	·23	5·55	1·03	27·33	1906-07	·62	2·50	2·87	15·32
1896-97	·30	4·20	1·30	22·48	1907-08	·39	5·10	2·10	31·49
1897-98	·38	2·87	1·89	15·77	1908-09	·71	3·11	3·60	21·22
1898-99	·20	3·24	·93	14·76	1909-10	·77	5·28	2·63	30·74
1899-00	·14	3·03	·68	14·07	1910-11	·41	5·73	2·15	34·90
Average for 10 years	·31	3·53	1·75	17·55	Average for 10 years	·472	4·37	2·02	24·18

Opium.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	...	...	...	...	1901-02	...	...	...	...
1891-92	...	...	...	...	1902-03	...	...	...	...
1892-93	1	...	·018	...	1903-04	(22)	...	·14	...
1893-94	...	...	...	...	1904-05	(28)	...	·18	...
1894-95	1	...	·003	...	1905,06	...	...	...	...
1895-96	...	...	...	...	1906-07	...	...	...	...
1896-97	1	...	·017	...	1907-08	...	...	...	...
1897-98	1	...	·017	·017	1908-09	...	...	...	...
1898-99	1	1	·003	...	1909-10	...	...	...	...
1899-00	1	...	·017	...	1910-11	...	...	...	...

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Paper and Pasteboard.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·03	...	·64	...	1901-02	·08	...	1·01	...
1891-92	·06	...	1·07	...	1902-03	·05	...	·62	...
1892-93	·04	...	·75	...	1903-04	·07	...	·82	...
1893-94	·07	...	·86	...	1904-05	·08	...	·88	...
1894-95	·06	...	·80	...	1905-06	·10	...	1·06	...
1895-96	·09	...	1·10	...	1906-07	·12	...	1·24	...
1896-97	·07	...	·91	...	1907-08	·13	...	1·43	...
1897-98	·09	...	1·23	...	1908-09	·10	...	1·15	...
1898-99	·07	...	·97	...	1909-10	·11	...	·24	...
1899-00	·08	...	1·04	...	1910-11	·14	...	·64	...
Average for 10 years	·07	...	·94	...	Average for 10 years	·13	...	·90	...

* Provisions.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·955	4·783	19·87	91·38	1901-02	·95	2·131	19·58	32·87
1891-92	1·207	3·991	26·07	81·21	1902-03	·95	2·42	18·42	35·52
1892-93	1·603	4·862	35·61	95·80	1903-04	1·38	2·62	27·21	36·58
1893-94	1·869	4·074	39·91	90·21	1904-05	1·28	2·515	25·41	36·38
1894-95	1·836	3·745	47·69	94·52	1905-06	1·06	2·59	21·09	36·33
1895-96	2·345	5·185	62·81	115·17	1906-07	1·39	2·42	28·58	34·62
1896-97	2·069	4·842	53·47	114·48	1907-08	1·56	1·643	31·14	26·36
1897-98	2·569	4·074	57·69	87·44	1908-09	1·29	2·17	25·48	39·35
1898-99	2·151	4·319	44·04	90·09	1909-10	1·44	2·525	29·73	45·54
1899-00	2·125	4·473	41·62	84·22	1910-11	1·09	1·00	21·60	16·89
Average for 10 years	1·87	4·43	42·87	94·45	Average for 10 years	1·23	2·20	24·82	34·04

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

* Figures under Provisions for the first decade probably included those for "furits and vegetables" and "wheat flour."

Appendix A—*contd.*

Railway Plant and Railway Stock.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·15	·04	·74	·30	1901-02	·05	·003	·15	·05
1891-92	·77	·03	3·08	·20	1902-03	·16	...	·59	...
1892-93	·84	...	3·10	·10	1903-04	·24	...	·94	...
1893-94	·86	·01	3·12	·19	1904-05	·68	·34	2·46	1·04
1894-95	·10	·06	·32	·19	1905-06	·83	·08	3·82	·32
1895-96	·17	·03	2·23	·16	1906-07	·75	·27	2·95	1·08
1896-97	·06	·02	·20	·11	1907-08	·76	...	2·49	...
1897-98	·20	·02	·73	·11	1908-09	...	...	...	...
1898-99	1·16	...	4·87	·01	1909-10	...	...	...	...
1899-00	·25	·02	·82	·09	1910-11	·73	·192	3·68	1·49
Average for 10 years	·45	·02	1·92	·14	Average ...	·52	·18	2·1	·8

Salt.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	3·02	·001	9·92	·004	1901-02	5·48	...	19·57	...
1891-92	3·67	·001	12·16	·003	1902-03	5·16	...	18·21	...
1892-93	4·44	·002	14·94	·001	1903-04	5·38	...	15·94	...
1893-94	4·54	·002	15·96	·001	1904-05	5·09	...	15·22	...
1894-95	4·48	·001	15·76	·002	1905-06	5·76	...	14·30	...
1895-96	4·68	·007	16·12	·021	1906-07	6·18	...	14·52	...
1896-97	4·22	·004	14·83	·016	1907-08	6·41	...	12·11	...
1897-98	5·07	·001	18·17	·026	1908-09	6·43	...	11·65	...
1898-99	4·98	·003	17·25	·010	1909-00	7·35	...	13·39	...
1899-00	4·78	·005	17·66	·019	1910-11	6·71	...	12·81	...
Average for 10 years	4·38	·003	15·27	·001	Average for 10 years	5·99	...	14·77	...

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Saltpetre, etc.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·04	...	·45	...	1901-02	·021	·003	·16	·03
1891-92	·02	...	·24	...	1902-03	...	...	...	...
1892-93	·03	...	·27	...	1903-04	·02	...	·14	...
1893-94	·02	...	·21	...	1904-05	·01	...	·13	...
1894-95	·02	...	·23	...	1905-06	·02	...	·18	...
1895-96	·02	...	·25	...	1906-07	·05	...	·33	...
1896-97	·02	...	·24	...	1907-08	·04	...	·24	...
1897-98	·02	...	·30	...	1908-09	·01	...	·11	...
1898-99	·01	...	·17	...	1909-10	·03	...	·23	...
1899-00	·01	...	·12	...	1910-11	·02	...	·15	...
Average for 10 years	·02	...	·24	...	Average ...	·022	...	·16	...

Silk, raw.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	...	·023	·196	11·93	1901-02	(·5)	·05	·02	34·56
1891-92	...	·024	·071	11·79	1902-03	...	·05	...	33·47
1892-93	...	·034	·021	17·55	1903-04	...	·05	...	35·07
1893-94	...	·024	·068	19·49	1904-05	(·48)	·04	·33	28·82
1894-95	...	·025	·020	21·10	1905-06	·001	·06	·38	39·12
1895-96	...	·035	·100	21·49	1906-07	·001	·06	·32	37·60
1896-97	...	·031	·126	20·19	1907-08	...	·06	...	48·17
1897-98	...	·030	·072	19·63	1908-09	·001	·06	·71	38·39
1898-99	...	·025	·011	17·67	1909-10	·001	·061	·34	34·97
1899-00	...	·031	·406	20·63	1910-11	...	·04	...	22·70
Average for 10 years	...	·02	·10	18·15	Average ...	...	·053	...	35·28

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Silk, piece-goods.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	...	...	9·08	2·32	1901-02	...	...	...	...
1891-92	...	...	1·70	·02	1902-03	...	...	...	...
1892-93	...	...	·23	·41	1903-04	...	...	...	...
1893-94	...	...	·02	·02	1904-05	...	...	...	...
1894-95	...	...	·32	·01	1905-06	...	...	...	...
1895-96	...	...	1·86	·35	1906-07	...	...	...	...
1896-97	...	...	2·63	·76	1907-08	...	(26)	...	·15
1897-98	...	...	1·46	·91	1908-09	...	...	...	...
1898-99	...	...	1·43	·81	1909-10	...	·005	...	3·14
1899-00	...	...	·89	·20	1910-11	...	...	...	...
Average for 10 years	...	...	1·96	·58					

Spices.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·393	·469	8·08	11·46	1901-02	·92	1·17	20·50	29·83
1891-92	·461	·887	6·32	16·73	1902-03	·86	1·40	16·63	34·15
1892-93	·403	1·169	6·34	21·00	1903-04	1·11	1·26	21·15	33·70
1893-94	·561	1·027	10·81	19·94	1904-05	1·20	·98	23·26	28·61
1894-95	·557	·987	11·64	23·47	1906-06	1·074	1·50	26·72	43·75
1895-96	·491	1·171	10·45	27·85	1906-07	1·35	1·32	27·91	41·55
1896-97	·628	1·031	13·65	23·70	1907-08	·99	1·45	22·68	39·31
1897-98	1·379	1·187	29·83	33·10	1908-09	1·16	1·25	30·01	36·51
1898-99	·867	·794	19·75	23·64	1909-10	1·30	1·78	28·20	59·49
1899-00	1·143	·128	22·09	34·88	1910-11	1·221	1·88	30·59	62·73
Average ...	·68	1·00	13·89	23·57	Average for 10 years	1·118	1·39	24·76	40·96

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Stone and Lime.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·57	·06	·55	·04	1901-02	3·07	·07	1·97	·04
1891-92	1·30	·18	·89	·12	1902-03	3·09	...	2·04	...
1892-93	1·47	·18	·92	·11	1903-04	2·55	·15	1·59	·09
1893-94	1·23	·05	·77	·03	1904-05	3·22	...	1·96	...
1894-95	1·49	·07	·93	·04	1905-06	3·29	...	2·05	...
1895-96	1·88	·08	1·18	·04	1906-07	2·57	...	1·51	...
1896-97	2·02	·10	1·39	·07	1907-08	2·49	...	1·45	...
1897-98	2·79	·12	2·09	·09	1908-09	2·45	...	1·40	...
1898-99	2·36	·06	1·47	·04	1909-10	2·27	...	1·31	...
1899-00	2·94	·06	1·84	·04	1910-11	2·53	...	1·51	...
Average for 10 years	1·80	·09	1·18	·06	Average for 10 years	2·75	...	1·67	...

Sugar.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·27	2·55	2·19	20·92	1901-02	2·10	1·93	12·97	14·15
1891-92	·56	1·39	4·48	12·53	1902-03	·85	2·85	5·32	19·73
1892-93	·41	1·09	3·62	11·58	1903-04	1·11	2·16	5·23	14·34
1893-94	1·16	1·34	7·65	12·98	1904-05	1·68	2·41	10·17	18·06
1894-95	1·87	1·55	10·63	13·83	1905-06	1·78	2·99	10·04	22·74
1895-96	1·05	2·22	6·55	18·19	1906-07	1·33	3·00	7·00	21·24
1896-97	1·03	2·30	6·75	18·29	1907-08	1·55	3·87	10·76	26·82
1897-98	1·47	1·31	11·15	11·19	1908-09	1·85	2·78	11·91	20·15
1898-99	1·57	1·29	10·27	9·66	1909-10	2·24	1·25	15·65	10·22
1899-00	1·35	2·20	8·15	14·73	1910-11	3·17	1·90	21·93	15·55
Average for 10 years	1·07	1·72	7·13	14·39	Average for 10 years	1·76	2·51	11·20	18·30

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Tea.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·01	...	·59	...	1901-02	·01	...	·67	...
1891-92	·01	...	·42	...	1902-03	·01	...	·59	...
1892-93	·01	...	·62	...	1903-04	...	...	...	...
1893-94	·01	...	1·25	...	1904-05	·02	...	·78	...
1894-95	·01	...	·77	...	1905-06	·01	...	·76	...
1895-96	·01	...	1·06	...	1906-07	·01	...	·79	...
1896-97	·01	...	1·34	...	1907-08	·01	...	·85	...
1897-98	·01	...	1·57	...	1908-09	·02	...	1·28	...
1898-99	·01	...	·75	...	1909-10	·02	...	1·10	...
1899-00	·01	...	·62	...	1910-11	·01	...	·99	...
Average for 10 years	·01	...	·90	...	Average ...	·012	...	·78	...

Tobacco.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·36	·01	4·22	·31	1901-02	·50	·04	6·46	·53
1891-92	·34	·01	3·89	·21	1902-03	·55	·03	8·65	·39
1892-93	·41	·02	5·30	·34	1903-04	·54	·03	6·86	·27
1893-94	·47	·03	9·68	·58	1904-05	·74	...	10·13	...
1894-95	·53	·01	11·29	·21	1906-06	·67	·06	10·07	·77
1895-96	·41	·01	8·46	·32	1906-07	·67	·08	10·58	1·21
1896-97	·45	·04	6·99	·67	1907-08	·67	·11	9·63	1·46
1897-98	·47	·05	7·11	·75	1908-09	·65	·10	9·83	1·65
1898-99	·61	·02	9·32	·31	1909-10	·73	·10	11·56	1·80
1899-00	·60	·02	9·64	·30	1910-11	·72	·13	10·83	2·16
Average for 10 years	·46	·02	7·58	·39	Average ...	·64	·06	9·46	1·02

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

Wool, raw.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	...	·01	·04	·24	1901-02	·07	·02	1·48	·59
1891-92	...	·01	·10	·21	1902-03	·05	·02	·97	·39
1892-93	...	·03	·06	·62	1903-04	·04	...	·78	...
1893-94	·01	·05	·20	1·06	1904-05	·04	...	·72	...
1894-95	·01	·04	·18	·74	1905-06	·08	...	1·69	...
1895-96	·01	·05	·19	·92	1906-07	·01	·01	·24	·25
1896-97	·05	·05	·95	·94	1907-08	·02	·004	·31	·14
1897-98	·04	·06	·87	1·31	1908-09	·07	·01	1·13	·13
1898-99	·05	·01	1·15	·39	1909-10	·06	·01	1·03	·21
1899-00	·05	·02	1·07	·57	1910-11	·08	·01	1·28	·19
Average ...	·02	·03	·48	·70	Average ...	·05	·008	·96	·19

Wool, manufactured.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	·017	·05	1·17	2·50	1901-02	·004	·08	·98	12·78
1891-92	·025	·04	1·67	1·95	1902-03	·026	·082	3·45	10·20
1892-93	·022	·03	1·49	1·96	1903-04	·005	·06	·47	6·66
1893-94	·024	·03	2·04	3·58	1904-05	·017	·053	2·50	6·72
1894-95	·030	·06	2·73	6·79	1905-06	·025	·04	3·17	5·03
1895-96	·030	·05	2·88	5·88	1906-07	·024	·04	2·93	4·59
1896-97	·030	·06	4·20	11·14	1907-08	·029	·053	3·22	6·38
1897-98	·040	·08	5·22	15·05	1908-09	·011	·066	2·74	6·22
1898-99	·031	·08	5·06	13·75	1909-10	·028	·044	2·71	4·17
1899-00	·040	·07	5·40	11·43	1910-11	·036	·06	2·86	5·00
Average for 10 years	·02	·05	3·18	7·40	Average for 10 years	·022	·051	2·50	6·77

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

APPENDIX A—*contd.*

All other articles of Merchandise.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1890-91	1·24	·83	43·41	2·91	1901-02	3·16	·71	11·06	2·49
1891-92	8·41	1·14	29·42	4·00	1902-03	3·92	·85	13·72	2·98
1892-93	8·65	1·01	30·28	3·55	1903-04	3·52	1·00	12·34	3·51
1893-94	9·24	1·16	32·35	4·07	1904-05	3·91	1·23	13·70	4·30
1894-95	8·91	1·17	31·18	4·10	1905-06	4·04	·96	14·16	3·35
1895-96	10·10	1·53	35·35	5·35	1906-07	3·77	1·32	13·19	4·61
1896-97	8·58	2·10	30·02	7·36	1907-08	4·75	1·73	16·60	6·02
1897-98	10·90	1·55	38·17	5·41	1908-09	6·45	2·26	22·59	7·89
1898-99	11·20	1·61	39·20	5·64	1909-10	6·27	2·18	21·93	7·60
1899-00	11·48	1·73	40·18	6·07	1910-11	5·85	1·79	19·84	6·26
Average for 10 years	9·93	1·38	34·95	4·84	Average for 10 years	4·56	1·40	15·96	4·91

* Apparel.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1901-02	·034	·014	5·43	2·24	1906-07	·02	·008	4·49	1·33
1902-03	·03	·01	4·51	1·48	1907-08	·03	·006	5·06	1·12
1903-04	·034	·006	4·53	·82	1908-09	·03	·005	4·52	·85
1904-05	·03	·007	3·82	·94	1909-10	·03	·004	5·15	·66
1905-06	·006	·009	4·28	1·29	1910-11	·04	·005	6·31	·96
					Average for 10 years	·027	·007	4·81	·86

* Wheat flour.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1901-02	·63	...	3·85	...	1906-07	·94	·05	4·85	·40
1902-03	·55	·02	2·78	·21	1907-08	·86	·05	5·02	·39
1903-04	·80	·03	3·95	·20	1908-09	·93	·05	6·05	·39
1904-05	·76	·03	3·96	·21	1909-10	·86	·04	5·40	·28
1905-06	·82	·05	4·14	·37	1910-11	·91	·03	5·13	·29
					Average for 10 years	·80	·04	4·51	·30

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

* Are classed separtely since 1901-02.

Appendix A—*concld.*

* Fodder.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1901-02	·72	·03	·51	·10	1906-07	1·45	·89	1·03	1·22
1902-03	·40	·12	·31	·37	1907-08	1·22	·12	1·03	·35
1903-04	·83	...	·54	...	1908-09	1·49	·13	1·33	·45
1904-05	·95	·07	·71	·15	1909-10	·74	·07	·49	·23
1905-06	1·19	·08	·81	·20	1910-11	·98	·09	·46	·29
					Average for 10 years	·99	·16	·72	·33

* Wood.

Years	Quantity		Value		Years	Quantity		Value *(a)*	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1901-02	9·59	·86	11·82	3·97	1906-07	11·52	1·45	43·23	5·76
1902-03	9·12	·85	26·40	2·80	1907-08	10·71	2·40	38·24	9·29
1903-04	8·72	·54	28·08	2·20	1908-09	8·28	1·90	30·74	7·83
1904-05	9·90	·92	33·92	3·56	1909-10	7·72	1·60	33·71	7·76
1905-06	9·89	1·64	35·83	5·93	1910-11	9·15	1·41	35·62	5·31
					Average for 10 years	9·46	1·48	31·75	5·44

* Fruits and Vegetables.

Years	Quantity		Value		Years	Quantity		Value	
	Imports	Exports	Imports	Exports		Imports	Exports	Imports	Exports
1901-02	·80	2·12	4·10	10·98	1906-07	·66	2·91	3·23	13·83
1902-03	·70	2·86	2·73	10·57	1907-08	·73	3·52	3·54	16·59
1903-04	·77	2·65	3·21	10·63	1908-09	·71	3·19	4·10	18·06
1904-05	·90	3·24	3·48	12·80	1909-10	·80	2·61	4·20	12·97
1905-06	·94	2·76	3·36	10·27	1910-11	1·47	2·62	8·12	13·97
					Average for 10 years	·84	2·85	4·00	13·07

Quantity in lakhs of Bengal maunds and value in lakhs of rupees.

* Are classed separately since 1901-02.

(a) Values given are those published at the end of "The External Trade of the Mysore State" and differ from those on page 21 of the same publication.

APPENDIX

Railborne traffic across the frontiers

Articles	1895—96				1896—97			
	Exports		Imports		Exports		Imports	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value
Animals.								
Horned cattle	·002	·07	·006	·21	·002	·08	·01	.41
Sheep and goats	·003	·01	·02	·08	...	...	·02	·08
Horses, ponies and mules ...	·006	·54	·008	·85	·008	·76	·007	·74
Other kinds	·006	·05	·01	·11	·005	·04	·008	·08
Apparel (including Drapery, etc.) ...	Not separately classed.							
Coal and Coke.								
Railway purposes	·06	·04	26·58	19·94	·02	·01	29·02	21·77
Other purposes								
Cotton.								
Raw	·32	5·71	·20	3·48	·28	5·18	·40	6·96
Twist and yarn (European) ...	·001	·08	·12	7·68	...	...	·12	7·67
Do (Indian) ...	·18	6·15	·14	4·79	·13	4·29	·18	6·02
Piece goods (European) ...	·004	·33	·39	26·09	·002	·17	·36	26·12
Do (Indian) ...	·05	2·80	·46	22·76	·07	3·67	·48	23·73
Others	No information given.							
Chemicals excepting saltpetre and drugs.								
Intoxicating, other than opium ...	...	...	·008	·25	...	...	·006	·28
Non-intoxicating—								
(1) Medical preparations ...	Not separately classed.							
(2) Others	·01	·68	·09	4·45	.02	·72	·10	4·61
Dyes and Tans.								
Alizarine and Aniline dyes ...	...	...	·003	·45	...	...	·002	·17
Cutch	·003	·06	·02	·34	·003	·06	·02	·36
Indigo	...	...	·002	·24	...	...	·001	·21
Myrabolams	·24	·73	·03	·09	·23	·70	·02	·07
Tanning barks	...	Not separately classed.						
Turmeric	·01	·04	·04	·17	·002	·01	·08	·40
Others	·58	8·45	·18	2·72	·36	3·69	·36	3·71
Fodder.								
Oilcake								
Hay, straw and grass ...	Not separately classed.							
Fruits and vegetables, fresh ...								
Grain and Pulse.								
Gram and pulse	2·72	6·51	1·21	2·99	1·55	5·11	1·37	4·06
Jawar and bajra	2·52	5·58	·07	·12	7·78	23·21	·06	·13

Value in lakhs of rupees and quantity

COMMERCIAL—PART III.

B.

of the Mysore State.

1897—98				1898—99				1899—00			
Exports		Imports		Exports		Imports		Exports		Imports	
Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value
·004	·14	·01	·46	·003	·12	·01	·37	·001	·04	·008	·29
...	...	·04	·16	...	...	·07	·31	·004	·02	·14	·55
·007	·64	·008	·95	·007	·61	·006	·71	·005	·52	·009	·88
·005	·04	·01	·09	·005	·05	·009	·08	·005	·03	·01	·09
·05	·04	31·74	23·50	·02	·02	42·45	31·84	·05	·04	40·89	33·23
·19	3·24	·56	9·23	·33	4·93	·31	4·49	·26	4·64	·19	3·36
...	...	·13	7·61	...	...	·10	5·76	...	...	·14	8·23
·16	4·9	·17	5·36	·08	2·40	·15	4·36	·15	4·61	·21	6·11
·002	·15	·37	27·50	·002	·17	·26	19·63	·002	·20	·33	24·40
·06	3·19	·52	24·76	·06	3·15	·46	22·14	·05	2·53	·58	28·44
...	...	·009	·77	...	...	·003	·34	...	...	·006	·70
·02	1·02	·14	6·41	·02	·67	·16	7·13	·04	1·70	·20	9·28
...	...	·002	·15	...	...	...	...	...	...	·001	·06
·004	·08	·02	·27	·004	·07	·02	·27	·005	·09	·01	·21
...	...	...	...	...	...	...	...	...	...	·001	·16
·20	·76	·05	·13	·23	·57	·01	·03	·43	1·08	·006	·01
·009	·06	·07	·47	·03	·22	·07	·57	·02	·17	·04	·37
1.14	10·72	.33	3·23	·94	7·88	.30	2·74	·73	6·29	·52	4·50
2·75	13·24	2·37	9·87	·68	1·96	2·03	6·02	2·50	9·01	1·31	4·13
7·58	28·86	·33	·93	2·29	5·36	·02	·05	5·35	18·83	·13	·35

in lakhs of Bengal maunds

APPENDIX

Articles	1895—96				1896—97			
	Exports		Imports		Exports		Imports	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value
Rice in the husk	1·06	1·86	·13	·23	·80	1·56	·26	·50
Rice not in the husk	·03	·10	6·52	19·61	·28	1·24	5·70	19·34
Wheat	·08	·23	1·08	2·99	·03	·15	·59	2·47
Wheat flour	Not separately classed.							
Others	7·69	10·86	·14	·25	8·86	14·72	·18	·38
Hides and Skins.								
Hides of cattle—								
(1) Dressed or tanned ...	·01	·41	·05	2·01	·009	·38	·03	1·36
(2) Raw	·004	·10	·04	·87	·005	·13	·13	2·74
Skins of sheep, etc.—								
(1) Dressed or tanned ...	·56	45·62	·14	7·85	·53	44·94	·08	4·89
(2) Raw	·58	19·89	·23	7·28	·59	23·45	·35	11·65
Horns	·01	·22	...	...	·01	·24	...	...
Hemp (Indian) and other fibres (except Jute)	...	...	...	...	·05	·16	·01	·06
Jute.								
Raw	...	...	...	...	...	...	...	...
Gunny bags and cloth	·11	1·39	·55	6·84	·13	1·41	·65	6·68
Lac ...	·002	·06	...	...	...	...	...	...
Leather.								
Unwrought	Not separately classed.							
Wrought except boots and shoes ...	·003	·45	·01	2·02	·005	1·01	·01	2·03
Liquors.								
Ale and beer	·05	1·25	·40	9·09	·01	·29	·31	7·80
Wines and spirits of all kinds ...	·06	8·05	·10	12·62	·05	·11	·12	14·82
All other sorts	...	...	...	...	...	...	...	...
Metals.								
Brass, unwrought	·003	·08	·06	1·81	·002	·05	·02	·74
Do manufactures	·02	·78	·08	3·49	·01	·55	·06	2·73
Copper, unwrought	·002	·006	·03	·98	·001	·003	·02	·64
Do manufactures	·006	·25	·04	1·44	·005	·20	·03	·94
Iron and steel, unwrought ...								
Do wrought—								
(1) Bars, sheets, etc. ...	* ·17	·79	4·41	19·2	·20	1·2	2·76	13·2
(2) Machinery and mill work ...								
(3) Other manufactures ...								
Metallic ores	No information.							
Others	02	·83	·11	5·03	·01	·68	·17	5·79

* Grouped under one head on account

Values in lakhs of rupees and quantity

B—*contd.*

1897—98				1898—99				1899—00			
Exports		Imports		Exports		Imports		Exports		Imports	
Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value
1·59	4·31	·01	·03	2·37	5·18	·19	·43	1·20	2·70	·14	·31
·71	3·79	4·59	19·22	·04	·15	5·22	19·17	·13	·64	6·82	24·84
·03	·17	·65	3·59	·01	·05	·6	2·39	·06	·25	6·9	3·12
23·23	56·10	·19	·39	8·79	16·88	·48	·96	3·68	8·19	·54	1·10
·002	·09	·04	1·69	·009	·33	·004	·13	·03	·98	·07	2·67
·006	·13	·12	2·56	·006	·12	·06	1·10	·04	·78	·09	1·48
·56	50·72	·07	3·72	·31	29·95	·05	3·29	·34	33·21	·04	2·54
·64	31·34	·33	12·74	·77	41·43	·11	4·08	·84	44·53	·11	5·19
·01	·21	...	...	·02	·27	...	...	·02	·36	...	...
·05	·33	·02	·09	·06	·39	·01	·03	·06	·46	·01	·04
...	...	...	...	...	...	...	...	...	...	...	...
·13	1·21	·83	8·10	·14	1·57	·43	4·83	·14	1·49	·46	4·83
...	...	·001	·04	...	...	·001	·03	·001	·04	...	...
·004	·65	·01	2·42	·002	·31	·01	2·11	·003	·93	·01	2·19
·002	·05	·24	5·80	...	...	·28	6·57	...	...	·31	7·48
·007	·84	·15	17·99	·002	·23	·15	18·66	·002	·16	·10	11·59
·05	·15	...	...	·10	·29	...	...	·05	·16	...	...
·002	·05	·03	·90	·002	·07	·007	·20	·005	·15	·002	·07
·01	·65	·09	3·89	·02	·78	·04	1·72	·01	·59	·02	1·17
...	...	·02	·89	...	...	·001	...	...	...	·001	...
·004	·16	·04	1·52	·005	·20	·02	·75	·005	·23	·01	·46
·18	1·4	4·03	27·1	·13	·83	2·98	20·7	·13	·75	2·40	16·9
·01	·48	·06	2·58	·01	·32	·05	1·81	·01	·62	·04	1·70

of difference in classification.
in lakhs of Bengal maunds.

Articles	1895—96				1896—97			
	Exports		Imports		Exports		Imports	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value
Mineral substances.								
Marble and stone	No information available.							
Chalk and lime								
Others								
Oils.								
Kerosine	·01	·06	1·03	5·48	·03	·20	1·10	5·84
Castor	·16	1·93	·02	·23	·07	·93	·02	·23
Cocoanut	·02	·33	·04	·66	·02	·33	·04	·66
Mustard and rape	·03	·42	.11	1·58	·02	·28	·11	1·80
Others								
Oil-seeds.								
Castor	·74	2·53	·10	·34	·63	2·61	·06	·24
Earth-nut	·33	1·40	·008	·03	·07	·33	·01	·05
Linseed	·004	·02	·002	·01	·003	·01	...	...
Poppy	...	...	·02	·18	...	...	·01	·12
Rape and mustard	·21	1·15	...	...	·13	·71	...	...
Til or gingelly	4·15	21·66	·03	·16	3·26	18·42	·02	·10
Others	0·12	·56	·06	·30	·10	·38	·19	·78
Opium. ...	Quantities are very insignificant.							
Paper and Paste Board. ...	...	...	·10	1·10	...	...	·07	·91
Provisions.								
Dried fruits and nuts	2·54	31·39	·15	1·99	1.84	23·39	·25	3·23
Ghee	·006	·18	·19	6·14	·02	·61	·20	7·41
Others	2·63	83·59	2·00	54·68	2·98	90·48	1·62	42·82
Railway Plant and Rolling Stock.								
Locomotive Engines and Tenders and parts thereof	...	...	·08	1·89	...	...	...	...
Carriage and Trucks and parts thereof	·003	·05	·003	·05	·003	·04	...	...
Materials—								
(1) Steel rails and fish plates ...	·02	·08	·06	·21	·02	·06	·05	·17
(2) Sleepers and keys of steel and cast iron ...	...	...	·01	·03	...	...	·002	·006
(3) Others	·01	·03	·02	·04	...	...	·008	·02
Salt ...	·007	·02	4·68	16·12	·004	·01	4·22	14·82
Saltpetre and other Saline Substances.								
Saltpetre	·002	·02	·02	·22	·002	·02	·02	·20
Other saline substances... ...	...	...	·002	·03	...	...	·004	·05
Silk, raw.								
Foreign	(3)	·01	(7)	·02	...	...	(10)	·05
Indian	·03	21·48	(13)	·08	·03	20·19	(12)	·08

Value in lakhs of rupees and quantity

B—*contd.*

1897—98				1898—99				1899—00			
Exports		Imports		Exports		Imports		Exports		Imports	
Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value
·03	·15	1·65	7·59	·02	·08	1·45	6·24	·04	·19	1·39	6·98
·02	·38	·02	·26	·01	·11	·02	·33	·01	·12	·02	·25
·01	·22	·04	·67	·02	·29	·03	·34	·005	·09	·05	·65
·02	·34	·15	2·38	·007	·10	·25	3·97	·02	·36	·27	4·17
·62	3·34	·03	·16	·92	3·68	·05	·21	1·21	5·16	·01	·04
·02	·13	·05	·21	·01	·04	·04	·15	·03	·13	·02	·10
·002	·01	·002	·008	·002	·008	·002	·01	·05	·26	·004	·01
...	...	·02	·16	...	...	·03	·20	...	...	·03	·21
·06	·31	...	...	·06	·28	...	...	·12	·51	...	...
2.09	11·69	·05	·30	1·96	9·87	·04	·19	1·38	7·20	·04	·21
·08	·29	·22	1·05	·28	·87	·04	·14	·23	·81	·03	·10
...	...	·10	1·24	...	...	·08	·98	...	...	·08	1·05
1·71	22·20	·43	5·59	1·78	23·78	·37	4·88	1·86	25·04	·36	4·48
·001	·05	·20	6·96	·004	·12	·19	6·13	·002	·05	·20	6·11
2·37	65·19	1·93	45·14	2·53	66·19	1·59	33·03	2·61	59·13	1·57	31·03
...	...	·005	·10	...	...	·01	·21	...	...	...	...
·003	·05	·006	·08	...	...	·01	·17	...	...	...	...
·01	·05	·07	·26	...	...	·09	·35	·02	·05	·04	·12
...	...	·02	·07	...	...	·01	·05	...	...	·17	·59
·007	·02	.10	·22	...	...	1·03	4·09	·009	·02	·04	·10
·008	·02	5·07	18·17	·003	·01	4·98	17·25	·005	·02	4·78	17·66
·002	·02	·02	·20	...	...	·01	·11	...	...	·008	·09
...	...	·008	·10	...	...	·005	·05	...	...	·003	·03
...	...	(2)	·005	...	...	...	...	...	...	(3)	·008
·03	19·63	(18)	·07	·02	17·67	(2)	·01	·03	20·73	(59)	·40

in lakhs of Bengal mauads.

APPENDIX

Articles	1895—96				1896—97			
	Exports		Imports		Exports		Imports	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value
Silk, Piece-goods.								
Foreign	...	...	·002	1·82	...	...	·003	2·54
Indian	(42)	·34	(5)	·04	(81)	·75	(10)	·08
Spices.								
Betel-nuts	·72	17·74	·12	2·81	·61	16·11	·10	2·36
Cardamoms	·007	1·12	...	...	·003	·72	...	...
Chillies	·16	·96	·10	·68	·19	1·41	·12	·92
Ginger	·002	·03	·004	·07	·003	·05	·003	·05
Pepper	·009	·15	·03	·47	·01	·25	·04	·59
Others	·28	7·84	·23	6·34	·21	5·16	·37	9·60
Sugar.								
Refined or crystallised, including sugar-candy	1·21	12·81	·16	1·79	1·14	11·80	·24	2·60
Unrefined—								
(1) Sugar	1·00	5·38	·89	4·76	1·16	6·49	·79	4·15
(2) Gur, rab, etc.								
Tea.								
Foreign	Very insignificant.							
Indian	...	...	·01	1·04	...	...	·01	1·33
Tobacco.								
Unmanufactured	·01	·20	·37	6·11	·04	·60	·43	5·38
Manufactured :—								
(1) Cigars	...	...	·02	1·20	...	...	·02	1·14
(2) Others	...	...	·02	1·15	...	...	·008	·47
Wood.								
Timber, unwrought	Not classed separately.							
Manufactured								
Wool.								
Raw	·05	·92	·01	·20	·05	·94	·05	·95
Manufactured :—								
(1) Carpets and rugs ...	...	...	...	...	...	...	...	...
(2) Piece-goods, European ...	...	...	·008	·77	...	...	·008	·72
(3) Do Indian ...	·05	5·84	·02	2·10	·06	11·14	·02	3·48
(4) Other sorts of manufactures	Practically nothing.							
All other articles of Merchandise...	1·53	5·35	10·10	35·35	2·10	7·36	8·58	30·02
Provincial total goods ...	33·38	357·11	66·16	361·08	36·97	362·37	64·96	354·61
Treasure.								
Gold coin and bullion (ozs.) ...	...	...	...	...	2·99	203·72	...	...
Silver coin (Govt. Rupees) ...	...	...	...	...	·83	2·22	7·46	20·06
Silver bullion	...	...	...	...	1·15	2·59	3·54	8·10

Values in lakhs of rupees and quantity

B—*contd.*

1897—98				1898—99				1899—00			
Exports		Imports		Exports		Imports		Exports		Imports	
Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value
...	...	(71)	·60	(30)	·25	·001	1·24	...	...	·001	·82
(89)	·91	(93)	·85	(52)	·55	(19)	·19	(19)	·20	(7)	·07
·64	20·22	·28	7·98	·57	16·99	·17	4·84	·98	25·87	·31	8·14
·007	2·47	...	...	·007	1·58	...	...	·01	3·17	...	...
·35	4·71	·60	7·41	·07	·63	·26	2·41	·08	·57	·43	3·09
·003	·05	·008	·12	·001	·01	·004	·05	·004	·05	·005	·06
·02	·35	·04	·68	·01	·31	·03	·76	·008	·24	·05	1·41
·17	5·29	·45	13·58	·13	4·09	·39	11·62	·19	4·97	·34	9·28
·69	7·05	·49	5·86	·61	5·52	·45	4·66	·13	1·33	·32	3·39
·62	4·13	·98	5·28	·68	4·14	1·12	5·61	2·07	13·39	1·02	8·81
...	...	·01	1·56	...	...	·01	·72	...	...	·01	·61
·05	·70	·45	5·94	·02	·26	·59	8·40	·02	·27	·59	8·64
...	...	·02	1·00	...	...	·02	·88	...	...	·02	·95
...	...	·003	·16	...	...	·002	·05	...	...	·002	·05
·06	1·31	·04	·87	·02	·39	·05	1·15	·03	·57	·05	1·08
·003	·44	·001	·13	·003	·54	·002	·20	·003	·31	·004	·42
...	...	·006	·5	...	...	·001	·11	...	...	·001	·11
·08	14·60	·03	4·59	·07	13·21	·03	4·75	·07	11·11	·03	4·87
1·55	5·41	10·90	38·17	1·61	5·64	11·20	39·20	1·73	6·07	11·48	41·09
50·87	412·06	75·71	426·10	29·01	305·08	84·09	364·14	29·41	335·29	83·22	377·45
2·23	144·04	...	...	3·95	242·48	...	...	10·45	622·76	...	...
4·93	13·25	25·85	69·47	11·57	31·09	17·85	47·96	3·62	9·74	19·07	51·24
...	...	5·35	10·37	...	...	2·84	5·33	·27	·51	2·24	4·21

in lakhs of Bengal maunds.

APPENDIX C.*

Statement showing the inwards and outwards traffic at the various Railway Stations in the Mysore State, for the years 1909, 1910 and 1911.

COAL AND COKE.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	8,290	792
	1910	...	189
	1911	...	...
Davangere ...	1909	...	...
	1910	480	...
	1911	584	...
Tolhunse to Chikjajur	1909	792	...
	1910	189	...
	1911	...	...
Holalkere ...	1909	...	...
	1910	...	...
	1911	...	...
Ramgiri to Ajjampur	1909	...	...
	1910	160	4
	1911	...	...
Birur ...	1909	260	...
	1910	...	176
	1911	7	...
Sivapur to Tarikere	1909	...	...
	1910	17	...
	1911	...	...
Maserhalli to Bidare	1909	...	...
	1910	...	...
	1911	...	...
Shimoga (including out agencies of Sagar and Tirthahalli ...	1909	4,165	...
	1910	18,909	...
	1911	10,226	...
Kadur to Banavar (including Chikmagalur out agencies ...	1909	...	...
	1910	4	...
	1911	...	...
Arsikere ...	1909	5,164	...
	1910	...	...
	1911	...	...
Konehalli ...	1909	...	...
	1910	...	...
	1911	...	...
Tiptur ...	1909	...	1
	1910	...	...
	1911	...	...
Karadi to Gubbi	1909	166	...
	1910	...	...
	1911	...	...
Tumkur	1909	...	1
	1910	...	...
	1911	...	...
Hirehalli to Yesavantapur...	1909	328	...
	1910	...	...
	1911	327	...
Kengeri to Chennapatna ...	1909	5	161
	1910	...	296
	1911	...	...
Settihalli to Yeliyur ...	1909	3,501	...
	1910	2,707	...
	1911	3,754	...
French Rocks to Paschimavahini	1909	525	...
	1910	3	...
	1911	...	...
Mysore and Mysore Pettah	1909	11,136	...
	1910	1,849	...
	1911	27	...
Kadakola to Nanjangud ...	1909	...	...
	1910	...	...
	1911	...	...
Dodkurrgod to Yelahanka	1909	1,375	...
	1910	6,978	...
	1911	42	...
Pachur to Kamasamudram	1909	...	...
	1910	...	...
	1911	...	...
Bowringpet	1909	20,134	...
	1910	...	28
	1911	....	...
Nine Reefs to Marikuppam	1909	491,189	4
	1910	2,142,987	27
	1911	2,426,103	...
Tyakal to Krishnarajapuram	1909	545	...
	1910	56	...
	1911	72	...
Bangalore East, Cantonment and Market office ...	1909	28,180	...
	1910	22,678	9
	1911	25,341	...
Bangalore City and Branch offices	1909	127,053	1,040
	1910	74,274	2,462
	1911	90,121	...
Total ...	1909	702,808	1,999
	1910	2,271,291	3,191
	1911	2,556,604	...

* Figures compiled from the Revenue Statistics published half-yearly by the M. S. M. Railway Company.

Cotton, Raw.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	4,388	39,503
	1910	12,387	70,296
	1911	891	82,646
Davangere	1909	7,187	84,589
	1910	7,641	77,997
	1911	3,656	147,743
Tolhunse to Chikjajur	1909	422	6
	1910	38	250
	1911	...	535
Holalkere	1909	107	3
	1910	18	354
	1911	12	1,010
Ramgiri to Ajjampur	1909	520	82
	1910	80	114
	1911	19	653
Birur	1909	403	1,491
	1910	8	3,672
	1911	5	...
Sivapur to Tarikere	1909	156	4
	1910	59	...
	1911	...	...
Maserhalli to Bidare	1909	117	...
	1910	11	...
	1911	...	...
Shimoga (including out agencies of Sagar and Tirthahalli	1909	461	1
	1910	239	...
	1911	17	...
Kadur to Banavar (including Chikmagalur out agencies	1909	1,221	19
	1910	165	24
	1911	23	67
Arsikere	1909	396	...
	1910	230	58
	1911	45	...
Konehalli	1909	...	...
	1910	...	...
	1911	...	...
Tiptur	1909	131	...
	1910	177	6
	1911	18	182
Karadi to Gubbi	1909	218	8
	1910	133	40
	1911	4	7
Tumkur	1909	30	160
	1910	156	13
	1911	9	...
Hirehalli to Yesavantapur	1909	7	...
	1910	11	2
	1911	6	2
Kengeri to Chennapatna	1909	376	53
	1910	18	26
	1911	143	4
Settihalli to Yeliyur	1909	2,203	1,282
	1910	518	68
	1911	23	...
French Rocks to Paschimavahini	1909	1,650	2
	1910	18	1
	1911	1	1
Mysore and Mysore Pettah	1909	1,285	6
	1910	638	1,694
	1911	118	21
Kadakola to Nanjangud	1909	59	14
	1910	173	287
	1911	9	735
Dodkurgod to Yelahanka	1909	...	6
	1910	13	36
	1911	2	346
Patchur to Kamasamudram	1909	190	...
	1910	2	...
	1911	44	...
Bowringpet	1909	53	235
	1910	6	5
	1911	29	...
Nine Reefs to Marikuppam	1909	187	6,447
	1910	562	25
	1911	700	7
Tyakal to Krishnarajapuram	1909	24	2
	1910	4	42
	1911	1	160
Bangalore East, Cantonment, and Market office	1909	5,767	998
	1910	55	689
	1911	22	...
Bangalore City and Branch offices	1909	67,442	16,290
	1910	35,155	1,421
	1911	49,387	309
Total	1909	95,000	151,201
	1910	58,515	157,117
	1911	55,184	234,428

Cotton Manufactured.

Stations		Inwards	Outwards
Devargudda to Haribar	1909	13,974	5,314
	1910	12,967	6,465
	1911	14,323	3,358
Davangere	1909	15,199	23,817
	1910	7,957	17,429
	1911	6,741	1,386
Tolhuhsi to Chikjajur	1909	1,671	243
	1910	1,427	103
	1911	1,997	823
Holalkere	1909	3,101	773
	1910	3,711	107
	1911	5,750	87
Ramgiri to Ajjampur	1909	2,168	762
	1910	2,960	381
	1911	3,168	227
Birur	1909	1,002	14
	1910	677	67
	1911	890	31
Sivapur to Tarikere	1909	3,250	82
	1910	1,956	40
	1911	1,691	76
Maserhalli to Bidare	1909	303	18
	1910	430	335
	1911	723	29
Shimoga (including out agencies of Sagar and Tirthahalli	1909	4,071	189
	1910	4,572	901
	1911	5,221	263
Kadur to Banavar (including Chikmagalur out agencies	1909	5,969	278
	1910	6,413	197
	1911	8,227	117
Arsikere	1909	6,661	203
	1910	8,327	166
	1911	8,017	51
Konehalli	1909	27	...
	1910	290	...
	1911	139	...
Tiptur	1909	4,296	465
	1910	5,611	279
	1911	5,312	222
Karadi to Gubbi	1909	2,483	120
	1910	3,143	112
	1911	4,705	213
Tumkur	1909	3,531	338
	1910	4,888	413
	1911	4,000	409
Hirehalli to Yesavantapur	1909	916	139
	1910	1,254	247
	1911	953	44
Kengeri to Channapatna	1909	3,101	653
	1910	1,742	584
	1911	1,683	59
Settihalli to Yeliyur	1909	9,005	1,502
	1910	7,776	1,184
	1911	13,906	951
French Rocks to Paschimavahini	1909	2,014	85
	1910	2,262	193
	1911	3,082	72
Mysore and Mysore Pettah	1909	18,031	1,285
	1910	17,955	393
	1911	23,105	491
Kadakola to Nanjangud	1909	4,338	487
	1910	3,283	520
	1911	3,981	64
Dodkurgod to Yelahanka	1909	4,474	1,295
	1910	3,810	635
	1911	4,152	727
Patchur to Kamasamudram	1909	1,499	79
	1910	2,678	44
	1911	1,518	50
Bowringpet	1909	3,195	302
	1910	5,366	183
	1911	6,533	142
Nine Reefs to Marikuppam	1909	5,731	73
	1910	4,051	106
	1911	4,752	86
Tyakal to Krishnarajapuram	1909	1,470	973
	1910	2,183	478
	1911	2,348	412
Bangalore East, Cantonment and Market office	1909	20,038	1,369
	1910	6,983	804
	1911	6,904	457
Bangalore City and Branch offices	1909	58,146	33,160
	1910	58,057	46,086
	1911	58,330	39,721
Total	1909	199,664	74,018
	1910	182,729	78,452
	1911	201,551	70,568

Dyes and Tans.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	690	3,296
	1910	581	3,061
	1911	3,542	1,787
Davangere	1909	1,689	5,786
	1910	906	3,919
	1911	1,796	4,895
Tolhunse to Chikjajur	1909	14	7,586
	1910	9	3,399
	1911	3	5,029
Holalkere	1909	360	5,539
	1910	61	3,880
	1911	172	4,329
Ramgiri to Ajjampur	1909	241	13,637
	1910	63	7,805
	1911	280	5,221
Birur	1909	325	326
	1910	576	945
	1911	135	158
Sivapur to Tarikere	1909	201	513
	1910	76	926
	1911	353	373
Maserhalli to Bidare	1909	9	81
	1910	...	152
	1911	6	10
Shimoga (including out agencies of Sagar and Tirthahalli	1909	291	1,090
	1910	176	1,409
	1911	174	1,336
Kadur to Banavar (including Chikmagalur out agencies	1909	459	11,301
	1910	372	8,143
	1911	1,129	7,358
Arsikere	1909	6,024	4,082
	1910	1,127	3,706
	1911	1,656	3,638
Konehalli	1909	440	3,682
	1910	549	844
	1911	...	135
Tiptur	1909	8,932	19,946
	1910	3,881	12,305
	1911	1,463	5,876
Karadi to Gubbi	1909	2,612	33,998
	1910	1,117	14,799
	1911	179	11,587
Tumkur	1909	365	2,071
	1910	273	4,686
	1911	311	4,071
Hirehalli to Yesavantapur	1909	218	329
	1910	189	136
	1911	9	484
Kengeri to Chennapatna	1909	1,410	358
	1910	334	47
	1911	1,206	298
Settihalli to Yeliyur	1909	40	845
	1910	197	1,552
	1911	195	2,354
French Rocks to Paschimavahini	1909	180	5,228
	1910	55	5,477
	1911	115	4,674
Mysore and Mysore Pettah	1909	2,015	1,145
	1910	2,385	3,114
	1911	4,081	9,816
Kadakola to Nanjangud	1909	137	9,640
	1910	586	10,769
	1911	552	10,161
Dodkurgod to Yelahanka	1909	1,347	10,459
	1910	1,207	8,474
	1911	1,485	14,982
Pachur to Kamasamudram	1909	36	3,784
	1910	30	5,105
	1911	251	7,989
Bowringpet	1909	2,243	83,409
	1910	656	35,165
	1911	1,262	58,227
Nine Reefs to Marikuppam	1909	6,520	953
	1910	369	42
	1911	1,022	45
Tyakal to Krishnarajapuram	1909	225	8,529
	1910	436	8,672
	1911	232	8,945
Bangalore East, Cantonment and Market offices	1909	13,848	115,842
	1910	8,638	82,338
	1911	22,985	85,711
Bangalore City and Branch offices	1909	63,760	65,934
	1910	41,346	11,941
	1911	46,106	18,097
Total	1909	114,631	419,389
	1910	66,197	242,811
	1911	90,700	270,586

Grain and Pulses.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	45,803	8,402
	1910	37,388	21,524
	1911	26,710	55,038
Davangere	1909	125,866	212,427
	1910	58,792	176,616
	1911	65,046	208,933
Tolhunsi to Chikjajur	1909	2,857	47,129
	1910	2,229	30,356
	1911	160	101,858
Holalkere	1909	39,588	16,173
	1910	7,540	26,110
	1911	5,461	88,800
Ramgiri to Ajjampur	1909	30,208	7,865
	1910	3,359	36,982
	1911	3,861	51,197
Birur	1909	30,083	1,275
	1910	4,489	1,402
	1911	6,748	4,350
Sivapur to Tarikere	1909	23,188	3,210
	1910	12,562	14,980
	1911	8,563	37,336
Maserhalli to Bidare	1909	2,812	698
	1910	338	34,703
	1911	2,185	90,853
Shimoga (including out agencies of Sagar and Tirthahalli	1909	38,585	16,808
	1910	24,191	94,402
	1911	32,605	273,871
Kadur to Banavar (including Chikmagalur out agencies	1909	56,909	7,904
	1910	8,455	43,295
	1911	11,869	83,317
Arsikere	1909	122,042	18,767
	1910	12,114	57,479
	1911	24,181	114,048
Konehalli	1909	3,538	35
	1910	460	304
	1911	318	1,910
Tiptur	1909	291,580	14,869
	1910	11,540	12,463
	1911	13,829	10,158
Karadi to Gubbi	1909	130,445	2,411
	1910	6,566	17,272
	1911	7,153	53,297
Tumkur	1909	68,535	30,729
	1910	9,362	358,152
	1911	4,829	462,666
Hirehalli to Yesavantapur	1909	6,686	2,260
	1910	4,022	4,947
	1911	4,516	5,435
Kengeri to Channapatna	1909	126,759	29,000
	1910	44,936	30,997
	1911	28,170	35,662
Settihalli to Yeliyur	1909	78,194	18,032
	1910	28,661	13,437
	1911	15,914	13,167
French Rocks to Paschimavahini	1909	26,482	55,057
	1910	6,182	49,080
	1911	7,848	55,098
Mysore and Mysore Pettah	1909	156,586	309,355
	1910	98,837	280,776
	1911	122,124	312,832
Kadakola to Nanjangud	1909	18,291	7,526
	1910	19,228	7,695
	1911	17,570	11,713
Dodkurgod to Yelahanka	1909	113,078	7,105
	1910	14,563	18,906
	1911	13,517	34,764
Pachur to Kamasamudram	1909	79,251	12,048
	1910	17,649	17,789
	1911	29,145	33,062
Bowringpet	1909	325,550	13,510
	1910	307,196	5,834
	1911	171,672	50,163
Nine Reefs to Marikuppam	1909	228,689	898
	1910	188,882	1,115
	1911	134,674	1,643
Tyakal to Krishnarajapuram	1909	33,576	14,462
	1910	15,575	10,270
	1911	3,471	47,945
Bangalore East, Cantonment and Market office	1909	204,617	14,139
	1910	147,024	11,277
	1911	123,120	12,487
Bangalore City and Branch offices	1909	1,755,110	307,065
	1910	1,300,045	157,393
	1911	1,078,983	361,692
Total	1909	4,164,908	1,179,159
	1910	2,392,185	1,535,556
	1911	1,964,242	2,613,295

Hides and Skins.

Stations		Inwards	Outwards
Devargudda to Haribar	1909	80	2,924
	1910	289	4,591
	1911	252	2,859
Davangere	1909	891	1,979
	1910	330	1,099
	1911	241	1,357
Tolhunse to Chikjajur	1909	421	2,000
	1910	1,312	2,180
	1911	333	1,807
Holalkere	1909	208	6,185
	1910	200	4,653
	1911	402	3,377
Ramgiri to Ajjampur	1909	897	5,078
	1910	795	2,298
	1911	632	1,539
Birur	1909	25	495
	1910	13	140
	1911	...	307
Sivapur to Tarikere	1909	81	3,652
	1910	32	2,143
	1911	11	1,908
Maserhalli to Bidare	1909	4	525
	1910	1	886
	1911	92	1,105
Shimoga (including out agencies of Sagar and Tirthahalli	1909	90	10,969
	1910	168	10,218
	1911	108	9,218
Kadur to Banavar (including Chikmagalur out agencies	1909	96	10,391
	1910	33	6,498
	1911	248	5,327
Arsikere	1909	14	15,866
	1910	84	3,725
	1911	29	4,141
Konehalli	1909	50	54
	1910	...	31
	1911	...	4
Tiptur	1909	113	1,233
	1910	51	3,842
	1911	82	3,647
Karadi to Gubbi	1909	197	7,121
	1910	223	4,061
	1911	7	3,389
Tumkur	1909	245	4,564
	1910	46	3,280
	1911	243	1,881
Hirehalli to Yesavantapur	1909	915	60
	1910	158	191
	1911	115	334
Kengeri to Chennapatna	1909	2,555	4,118
	1910	891	1,712
	1911	3,169	2,581
Settihalli to Yeliyur	1909	94	2,287
	1910	9	1,902
	1911	62	2,238
French Rocks to Paschimavahini	1909	24	7,098
	1910	24	4,686
	1911	24	2,274
Mysore and Mysore Pettah	1909	418	14,946
	1910	742	22,111
	1911	515	25,359
Kadakola to Nanjangud	1909	31	77,19
	1910	25	3,983
	1911	149	4,780
Dodkurgod to Yelahanka	1909	69	2,526
	1910	53	818
	1911	128	1,564
Pachur to Kamasamudram	1909	287	1,836
	1910	41	1,835
	1911	22	1,962
Bowringpet	1909	2,725	14,927
	1910	2,431	13,544
	1911	2,195	15,229
Nine Reefs to Marikuppam	1909	133	3,891
	1910	157	3,941
	1911	73	3,540
Tyakal to Krishnarajapuram	1909	3	916
	1910	29	565
	1911	57	640
Bangalore East, Cantonment and Market offices	1909	38,176	91,711
	1910	52,877	53,661
	1911	64,176	44,359
Bangalore City and Branch offices	1909	70,724	1,808
	1910	70,887	7,229
	1911	54,892	9,360
Total	1909	119,566	226,879
	1910	131,901	165,823
	1911	128,257	156,086

Provisions.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	11,406	6,475
	1910	10,404	10,706
	1911	10,538	2,520
Davangere	1909	20,054	10,146
	1910	14,740	39,14
	1911	18,632	3,025
Tolhunse to Chikjajur	1909	1,998	74
	1910	1,328	883
	1911	979	519
Holalkere	1909	10,835	2,133
	1910	1,502	3,434
	1911	1,698	4,491
Ramgiri to Ajjampur	1909	2,475	12,795
	1910	1,648	15,823
	1911	1,114	8,912
Birur	1909	985	9,994
	1910	569	3,636
	1911	630	16,342
Sivapur to Tarikere	1909	3,266	6,313
	1910	2,801	9,969
	1911	3,640	11,214
Maserhalli to Bidare	1909	254	...
	1910	380	38
	1911	340	33
Shimoga (including out agencies of Sagar and Tirthahalli	1909	8,021	5,430
	1910	14,809	12,505
	1911	12,624	2,014
Kadur to Banavar (including Chikmagalur out agencies	1909	3,226	24,698
	1910	3,778	22,817
	1911	3,040	18,711
Arsikere	1909	3,549	43,837
	1910	2,908	13,733
	1911	2,542	30,346
Konehalli	1909	67	2,290
	1910	1,105	6,013
	1911	8	2,059
Tiptur	1909	1,559	100,752
	1910	7,218	93,484
	1911	2,216	166,886
Karadi to Gubbi	1909	4,115	2,079
	1910	2,235	2,458
	1911	1,879	2,144
Tumkur	1909	1,943	1,851
	1910	2,921	1,561
	1911	1,233	449
Hirehalli to Yesavantapur	1909	8,273	70
	1910	12,900	153
	1911	5,822	74
Kengeri to Chennapatna	1909	5,313	6,188
	1910	2,279	8,732
	1911	1,152	17,845
Settihalli to Yeliyur	1909	5,705	695
	1910	1,356	886
	1911	1,151	1,028
French Rocks to Paschimavahini	1909	4,074	12,989
	1910	2,066	16,341
	1911	1,843	8,665
Mysore and Mysore Pettah	1909	14,064	16,667
	1910	16,315	4,680
	1911	15,077	1,293
Kadakola to Nanjangud	1909	2,504	3,741
	1910	1,403	1,345
	1911	10,006	2,059
Dodkurgod to Yelahanka	1909	10,545	7,946
	1910	12,847	7,928
	1911	2,160	2,663
Pachur to Kamasamudram	1909	1,498	10,420
	1910	1,184	7,081
	1911	871	4,267
Bowringpet	1909	37,029	15,173
	1910	40,768	7,329
	1911	42,185	2,296
Nine Reefs to Marikuppam	1909	26,984	267
	1910	13,300	107
	1911	8,034	616
Tyakal to Krishnarajapuram	1909	1,410	19,251
	1910	5,652	18,643
	1911	2,672	605
Bangalore East, Cantonment, and Market offices	1909	71,393	17,575
	1910	24,524	10,228
	1911	17,017	2,919
Bangalore City and Branch offices	1909	109,636	71,091
	1910	72,260	37,515
	1911	81,783	22,820
Total	1909	372,181	410,940
	1910	275,200	321,942
	1911	241,886	336,795

Metals, (Manganese and Chrome).

Stations		Inwards	Outwards
Devargudda to Harihar	1909	...	...
	1910	...	...
	1911	...	...
Davangere ...	1909	...	...
	1910	...	...
	1911	...	...
Tolhunse to Chikjajur	1909	...	152,189
	1910	...	48,819
	1911	...	...
Holalkere ...	1909	...	...
	1910	...	...
	1911	...	...
Ramgiri to Ajjampur	1909	...	...
	1910	...	...
	1911	...	...
Birur ...	1909	...	...
	1910	...	...
	1911	...	...
Sivapur to Tarikere	1909	...	130,284
	1910	...	...
	1911	...	...
Maserhalli to Bidare	1909	...	299,470
	1910	...	207,021
	1911	...	184,794
Shimoga (including out agencies of Sagar and Tirthahalli ...	1909	...	...
	1910	...	444,583
	1911	...	164,647
Kadur to Banavar (including Chikmagalur out agencies ...	1909	...	...
	1910	...	...
	1911	...	...
Arsikere ...	1909	...	...
	1910	...	...
	1911	...	...
Konehalli ...	1909	...	...
	1910	...	...
	1911	...	...
Tiptur ...	1909	...	...
	1910	...	...
	1911	...	...
Karadi to Gubbi	1909	...	...
	1910	...	31,019
	1911	...	27,025
Tumkur ...	1909	...	...
	1910	...	...
	1911	...	...
Hirehalli to Yesavantapur	1909	...	...
	1910	...	...
	1911	...	...
Kengeri to Chennapatna	1909	...	...
	1910	...	...
	1911	...	...
Settihalli to Yeliyur	1909	...	...
	1910	...	...
	1911	...	...
French Rocks to Paschimavahini ...	1909	...	...
	1910	...	...
	1911	...	...
Mysore and Mysore Pettah	1909	...	...
	1910	...	...
	1911	...	...
Kadakola to Nanjangud	1909	...	25,153
	1910	...	...
	1911	...	...
Dodkurgod to Yelahanka	1909	...	...
	1910	...	...
	1911	...	...
Pachur to Kamasamudram	1909	...	...
	1910	...	...
	1911	...	...
Bowringpet ...	1909	...	...
	1910	...	...
	1911	...	...
Nine Reefs to Marikuppam	1909	...	...
	1910	...	...
	1911	...	...
Tyakal to Krishnarajapuram	1909	...	...
	1910	...	...
	1911	...	...
Bangalore East, Cantonment and Market office	1909	...	...
	1910	...	...
	1911	...	...
Bangalore City and Branch offices ...	1909	...	...
	1910	...	...
	1911	...	...
Total	1909	...	607,096
	1910	...	731,442
	1911	...	376,466

Metal (others).

Stations		Inwards	Outwards
Devargudda to Harihar	1909	7,182	10,447
	1910	6,113	1,460
	1911	8,801	1,733
Davangere	1909	10,102	1,337
	1910	12,024	1,884
	1911	18,744	2,569
Tolhunsi to Chikjajur	1909	962	80
	1910	570	106
	1911	800	143
Holalkere	1909	3,187	263
	1910	2,011	155
	1911	3,810	460
Ramgiri to Ajjampur	1909	2,890	357
	1910	1,562	624
	1911	3,331	243
Birur	1909	682	408
	1910	866	128
	1911	1,207	109
Sivapur to Tarikere	1909	3,178	15,083
	1910	3,726	85
	1911	2,647	140
Maserhalli to Bidare	1909	323	15,266
	1910	141	100
	1911	1,362	95
Shimoga (including out agencies of Sagar and Tirthahalli	1909	7,143	442
	1910	7,748	4,072
	1911	7,678	3,816
Kadur to Banavar (including Chikmagalur out agencies	1909	3,913	429
	1910	4,299	451
	1911	7,097	787
Arsikere	1909	3,583	590
	1910	3,662	544
	1911	5,350	421
Konehalli	1909	95	46
	1910	221	10
	1911	260	17
Tiptur	1909	8,456	836
	1910	7,620	438
	1911	10,066	549
Karadi to Gubbi	1909	1,965	3,228
	1910	1,604	596
	1911	2,493	235
Tumkur	1909	2,123	3,198
	1910	1,941	475
	1911	2,449	788
Hirehalli to Yesavantapur	1909	2,498	933
	1910	5,084	1,471
	1911	14,940	1,581
Kengeri to Channapatna	1909	1,554	3,119
	1910	866	231
	1911	778	349
Settihalli to Yeliyur	1909	8,842	1,387
	1910	3,113	958
	1911	7,144	1,521
French Rocks to Paschimavahini	1909	6,009	687
	1910	5,634	550
	1911	13,794	636
Mysore and Mysore Pettah	1909	29,196	111,447
	1910	33,953	12,672
	1911	37,466	28,593
Kadakola to Nanjangud	1909	1,374	31,394
	1910	1,860	12,531
	1911	2,534	15,274
Dodkurgod to Yelahanka	1909	1,617	220
	1910	1,390	1,204
	1911	2,206	618
Pachur to Kamasamudram	1909	1,997	141
	1910	1,330	337
	1911	1,760	1,159
Bowringpet	1909	6,774	12,12
	1910	9,797	6,543
	1911	8,968	3,688
Nine Reefs to Marikuppam	1909	53,643	40,141
	1910	89,353	18,955
	1911	120,815	11,768
Tyakal to Krishnarajapuram	1909	4,750	358
	1910	3,555	856
	1911	2,495	1,406
Bangalore East, Cantonment and Market offices	1909	34,633	6,907
	1910	35,314	5,662
	1911	27,414	7,609
Bangalore City and Branch offices	1909	48,320	42,666
	1910	67,337	26,473
	1911	85,911	34,228
Total	1909	256,991	292,618
	1910	312,694	99,571
	1911	402,320	120,535

Oil-seeds.

Stations		Inwards	Outwards
Devargudda to Haribar	1909	3,201	5,060
	1910	3,794	8,231
	1911	2,943	37,953
Davangere	1909	15,201	123,510
	1910	6,710	250,091
	1911	7,578	352,571
Tolhunse to Chikjajur	1909	352	1,720
	1910	124	4,102
	1911	268	3,522
Holalkere	1909	717	1,739
	1910	723	5,953
	1911	437	6,235
Ramgiri to Ajjampur	1909	442	38,817
	1910	743	46,302
	1911	614	36,224
Birur	1909	1,243	2,670
	1910	921	222
	1911	818	719
Sivapur to Tarikere	1909	4,864	8,751
	1910	996	755
	1911	1,462	1,382
Maserhalli to Bidare	1909	162	18
	1910	253	1,152
	1911	121	1,144
Shimoga (including out agencies of Sagar and Tirthahalli	1909	6,412	10,240
	1910	3,895	1,728
	1911	3,817	8,116
Kadur to Banavar (including Chikmagalur out agencies	1909	540	18,035
	1910	1,999	9,875
	1911	1,428	10,312
Arsikere	1909	19,984	33,827
	1910	2,516	14,045
	1911	1,559	65,379
Konehalli	1909	...	512
	1910	35	124
	1911	...	174
Tiptur	1909	4,651	39,863
	1910	5,551	37,381
	1911	970	40,444
Karadi to Gubbi	1909	3,008	1,492
	1910	670	6,751
	1911	246	4,412
Tumkur	1909	2,468	19,787
	1910	910	51,023
	1911	678	40,457
Hirehalli to Yesavantapur	1909	4,239	26
	1910	2,353	148
	1911	403	74
Kengeri to Chennapatna	1909	2,129	23,748
	1910	1,606	29,017
	1911	1,821	53,036
Settihalli to Yeliyur	1909	646	162
	1910	1,145	358
	1911	520	810
French Rocks to Paschimavahini	1909	641	17,270
	1910	686	22,737
	1911	778	37,932
Mysore and Mysore Pettah	1909	5,295	65,307
	1910	11,934	111,327
	1911	11,482	69,459
Kadakola to Nanjangud	1909	1,642	675
	1910	3,536	6,682
	1911	6,213	3,325
Dodkurgod to Yelahanka	1909	5,208	1,257
	1910	1,695	9,624
	1911	3,226	8,665
Pachur to Kamasamudram	1909	948	3,941
	1910	350	4,388
	1911	985	4,645
Bowringpet	1909	6,348	52,306
	1910	1,776	8,905
	1911	1,239	41,124
Nine Reefs to Marikuppam	1909	3,180	2,529
	1910	1,252	51
	1911	7,367	363
Tyakal to Krishnarajapuram	1909	1,301	9,745
	1910	171	3,877
	1911	159	9,729
Bangalore East, Cantonment, and Market offices	1909	4,291	425
	1910	570	127
	1911	672	332
Bangalore City and Branch offices	1909	30,431	3,293
	1910	66,804	4,302
	1911	50,473	8,769
Total	1909	129,544	6,725
	1910	123,718	6,008
	1911	108,277	7,307

Oils.

Stations		Inwards	Outwards
Devargudda to Haribar	1909	14,228	2,550
	1910	14,257	4,206
	1911	10,024	662
Davangere	1909	23,510	7,203
	1910	28,846	4,844
	1911	44,723	4,519
Tolhunse to Chikjajur	1909	895	13
	1910	1,227	178
	1911	1,360	239
Holalkere	1909	4,048	472
	1910	5,063	73
	1911	6,802	68
Ramgiri to Ajjampur	1909	3,809	2,802
	1910	2,699	357
	1911	3,058	27
Birur	1909	11,992	1,908
	1910	9,977	2,675
	1911	12,655	3,083
Sivapur to Tarikere	1909	3,754	2,374
	1910	3,051	484
	1911	2,975	20
Maserhalli to Bidare	1909	1,279	4
	1910	715	16
	1911	866	130
Shimoga (including out agencies of Sagar and Tirthahalli	1909	15,467	574
	1910	13,903	110
	1911	15,934	526
Kadur to Banavar (including Chikmagalur out agencies	1909	4,485	1,827
	1910	1,687	323
	1911	1,964	254
Arsikere	1909	32,764	15,389
	1910	35,979	1,910
	1911	37,663	3,755
Konehalli	1909	...	68
	1910	24	1
	1911	...	...
Tiptur	1909	75,68	27,749
	1910	8,107	4,037
	1911	10,363	3,263
Karadi to Gubbi	1909	6,683	874
	1910	6,192	102
	1911	6,864	625
Tumkur	1909	6,436	2,745
	1910	5,992	864
	1911	5,939	195
Hirehalli to Yesavantapur	1909	470	706
	1910	112	77
	1911	220	42
Kengeri to Chennapatna	1909	6,990	7,237
	1910	8,772	756
	1911	7,154	758
Settihalli to Yeliyur	1909	15,175	906
	1910	14,427	607
	1911	13,639	296
French Rocks to Paschimavahini	1909	10,254	1,322
	1910	7,893	443
	1911	8,642	1,385
Mysore and Mysore Pettah	1909	37,102	1,432
	1910	41,238	387
	1911	54,416	2,796
Kadakola to Nanjangud	1909	23,572	387
	1910	19,000	9
	1911	23,249	86
Dodkurgod to Yelahanka	1909	762	335
	1910	832	336
	1911	1,834	917
Pachur to Kamasamudram	1909	2,475	691
	1910	2,114	228
	1911	3,349	282
Bowringpet	1909	27,646	4,717
	1910	17,990	3,646
	1911	16,976	3,021
Nine Reefs to Marikuppam	1909	21,246	57
	1910	12,574	147
	1911	14,528	79
Tyakal to Krishnarajapuram	1909	4,136	2,366
	1910	4,549	309
	1911	3,987	109
Bangalore East, Cantonment and Market offices	1909	12,000	1,196
	1910	16,521	1,716
	1911	14,919	2,513
Bangalore City and Branch offices	1909	140,172	40,872
	1910	165,417	62,108
	1911	154,499	68,525
Total	1909	438,918	128,776
	1910	449,158	90,946
	1911	473,318	98,175

Salt.

Stations		Inwards	Outwards
Devargudda to Haribar	1909	35,921	87
	1910	37,334	36
	1911	55,357	34
Davangere	1909	32,466	2,549
	1910	37,146	1,243
	1911	36,565	1,047
Tolhunse to Chikjajur	1909	1,236	...
	1910	1,044	17
	1911	415	...
Holalkere	1909	14,643	28
	1910	14,643	407
	1911	12,007	350
Ramgiri to Ajjampur	1909	10,740	947
	1910	5,261	248
	1911	6,524	426
Birur	1909	6,447	519
	1910	5,289	508
	1911	6,339	2
Sivapur to Tarikere	1909	5,166	497
	1910	15,930	663
	1911	13,185	187
Maserhalli to Bidare	1909	624	...
	1910	183	57
	1911	235	63
Shimoga (including out agencies of Sagar and Tirthahalli	1909	13,828	137
	1910	16,208	152
	1911	12,887	41
Kadur to Banavar (including Chikmagalur out agencies	1909	44,554	641
	1910	34,658	66
	1911	29,141	442
Arsikere	1909	31,146	382
	1910	47,946	829
	1911	47,904	224
Konehalli	1909	...	...
	1910	20	...
	1911	96	...
Tiptur	1909	27,540	635
	1910	31,973	204
	1911	25,051	243
Karadi to Gubbi	1909	25,674	116
	1910	22,993	391
	1911	15,245	260
Tumkur	1909	22,946	13,010
	1910	23,384	11,403
	1911	14,295	9,988
Hirehalli to Yesavantapur	1909	868	...
	1910	1,250	...
	1911	439	...
Kengeri to Chennapatna	1909	31,408	396
	1910	26,287	157
	1911	27,891	101
Settihalli to Yeliyur	1909	22,484	115
	1910	27,801	123
	1911	34,432	310
French Rocks to Paschimavahini	1909	18,072	597
	1910	21,836	139
	1911	18,727	...
Mysore and Mysore Pettah	1909	90,507	986
	1910	97,911	264
	1911	84,198	280
Kadakola to Nanjangud	1909	40,100	119
	1910	36,160	...
	1911	29,119	...
Dodkurgod to Yelahanka	1909	9,763	2
	1910	10,351	...
	1911	12,379	263
Pachur to Kamasamudram	1909	10,375	10
	1910	8,163	...
	1911	10,160	...
Bowringpet	1909	60,561	270
	1910	62,433	161
	1911	52,615	126
Nine Reefs to Marikuppam	1909	1,278	...
	1910	1,009	...
	1911	1,196	3
Tyakal to Krishnarajapuram	1909	24,696	114
	1910	26,716	21
	1911	19,018	...
Bangalore East, Cantonment and Market offices	1909	10,076	38
	1910	45,147	183
	1911	5,513	303
Bangalore City and Branch offices	1909	133,327	7,443
	1910	116,541	4,699
	1911	143,237	6,080
Total	1909	726,466	29,638
	1910	775,617	32,971
	1911	714,470	20,973

Spices.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	1,627	13,636
	1910	782	3,527
	1911	1,067	2,387
Davangere	1909	9,379	11,758
	1910	7,033	5,257
	1911	8,200	18,135
Tolhunsi to Chikjajur	1909	253	656
	1910	280	595
	1911	202	536
Holalkere	1909	853	3,241
	1910	694	1,777
	1911	1,330	2,503
Ramgiri to Ajjampur	1909	867	12,164
	1910	472	15,109
	1911	591	36,626
Birur	1909	16,617	78,259
	1910	7,798	67,957
	1911	12,121	63,778
Sivapur to Tarikere	1909	622	1,994
	1910	1,223	2,542
	1911	471	3,926
Maserhalli to Bidare	1909	89	502
	1910	37	835
	1911	104	985
Shimoga (including out agencies of Sagar and Tirthahalli	1909	1,487	68,256
	1910	1,648	72,850
	1911	2,334	85,626
Kadur to Banavar (including Chikmagalur out agencies	1909	468	2,780
	1910	1,202	5,509
	1911	1,024	11,113
Arsikere	1909	8,839	30,307
	1910	6,663	30,365
	1911	13,889	60,452
Konehalli	1909	...	3
	1910	29	40
	1911	172	47
Tiptur	1909	3,704	4,134
	1910	2,351	653
	1911	3,901	768
Karadi to Gubbi	1909	5,571	3,964
	1910	4,324	910
	1911	6,506	1,349
Tumkur	1909	4,751	1,000
	1910	2,782	1,402
	1911	4,212	1,242
Hirehalli to Yesavantapur	1909	439	57
	1910	839	172
	1911	997	156
Kengeri to Channapatna	1909	10,228	542
	1910	9,496	178
	1911	6,979	523
Settihalli to Yeliyur	1909	3,793	73
	1910	4,659	104
	1911	3,743	117
French Rocks to Paschimavahini	1909	5,299	416
	1910	1,724	186
	1911	1,267	127
Mysore and Mysore Pettah	1909	27,336	1,421
	1910	25,027	2,699
	1911	18,727	7,822
Kadakola to Nanjangud	1909	1,909	637
	1910	3,448	1,430
	1911	2,547	2,169
Dodkurgod to Yelahanka	1909	1,963	1,596
	1910	2,439	1,811
	1911	4,379	1,428
Pachur to Kamasamudram	1909	2,307	1,385
	1910	1,844	55
	1911	3,258	848
Bowringpet	1909	33,245	530
	1910	31,368	735
	1911	32,644	1,005
Nine Reefs to Marikuppam	1909	3,471	1,573
	1910	968	114
	1911	1,471	30
Tyakal to Krishnarajapuram	1909	2,243	113
	1910	2,831	202
	1911	2,817	653
Bangalore East, Cantonment and Market offices	1909	22,642	988
	1910	13,877	867
	1911	6,203	785
Bangalore City and Branch offices	1909	75,224	21,115
	1910	94,491	16,623
	1911	199,479	21,438
Total	1909	245,226	263,100
	1910	230,329	234,504
	1911	250,635	326,574

Sugar.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	3,144	1,365
	1910	7,114	531
	1911	10,405	1,312
Davangere	1909	19,937	3,357
	1910	32,163	3,492
	1911	27,050	20,044
Tolhunse to Chikjajur	1909	699	175
	1910	1,636	105
	1911	878	1,210
Holalkere	1909	5,001	59
	1910	10,812	367
	1911	8,229	1,036
Ramgiri to Ajjampur	1909	4,008	92
	1910	5,872	413
	1911	2,472	227
Birur	1909	1,025	57
	1910	1,935	52
	1911	720	55
Sivapur to Tarikere	1909	2,402	3,712
	1910	2,485	111
	1911	1,663	63
Maserhalli to Bidare	1909	1,242	...
	1910	483	38
	1911	742	35
Shimoga (including out agencies of Sagar and Tirthahalli	1909	5,821	2,263
	1910	8,616	1,755
	1911	5,089	929
Kadur to Banavar (including Chikmagalur out agencies	1909	2,411	4,343
	1910	3,267	114
	1911	2,582	9,083
Arsikere	1909	3,553	4,078
	1910	10,492	7,341
	1911	3,972	10,646
Konehalli	1909	225	...
	1910	50	29
	1911	54	...
Tiptur	1909	3,369	23,180
	1910	3,701	15,589
	1911	1,872	69,149
Karadi to Gubbi	1909	1,251	28
	1910	2,664	2,410
	1911	1,414	826
Tumkur	1909	1,466	99
	1910	1,883	6,176
	1911	6,838	3,656
Hirehalli to Yesavantapur	1909	182	456
	1910	164	2,123
	1911	59	3,909
Kengeri to Chennapatna	1909	1,710	1,075
	1910	1,763	30
	1911	573	8,646
Settihalli to Yeliyur	1909	2,366	12
	1910	1,573	187
	1911	1,261	967
French Rocks to Paschimavahini	1909	22,188	1,173
	1910	1,946	70
	1911	1,757	520
Mysore and Mysore Pettah	1909	15,684	641
	1910	20,526	260
	1911	15,682	412
Kadakola to Nanjangud	1909	4,293	5
	1910	4,140	34
	1911	10,176	391
Dodkurgod to Yelahanka	1909	23,495	71,837
	1910	95,065	75,437
	1911	3,871	118,370
Pachur to Kamasamudram	1909	242	5,771
	1910	141	10,968
	1911	414	12,049
Bowringpet	1909	7,433	51,494
	1910	4,577	60,223
	1911	4,524	44,598
Nine Reefs to Marikuppam	1909	4,832	171
	1910	4,375	158
	1911	5,287	3,692
Tyakal to Krishnarajapuram	1909	201	3,152
	1910	201	1,694
	1911	195	3,123
Bangalore East, Cantonment, and Market offices	1909	28,628	7,636
	1910	8,880	2,233
	1911	16,717	1,573
Bangalore City and Branch offices	1909	228,918	63,167
	1910	242,563	153,291
	1911	181,122	150,232
Total	1909	395,732	249,398
	1910	479,087	345,231
	1911	315,598	466,753

Wood.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	6,213	2,520
	1910	7,280	1,973
	1911	27,877	,4692
Davangere	1909	16,490	23,002
	1910	29,070	2,720
	1911	82,451	4,369
Tolhunse to Chikjajur	1909	931	15,179
	1910	1,049	4,740
	1911	1,545	14,146
Holalkere	1909	1,456	2,390
	1910	3,847	7,361
	1911	5,542	7,838
Ramgiri to Ajjampur	1909	712	423
	1910	804	1,982
	1911	2,999	12,629
Birur	1909	136	57
	1910	305	930
	1911	371	16,712
Sivapur to Tarikere	1909	1,363	70,705
	1910	781	38,438
	1911	451	73,750
Maserhalli to Bidare	1909	465	32,033
	1910	600	15,185
	1911	275	11,171
Shimoga (including out agencies of Sagar and Tirthahalli	1909	5,873	145,281
	1910	353	127,473
	1911	662	155,440
Kadur to Banavar (including Chikmagalur out agencies	1909	3,426	18,143
	1910	1,358	16,984
	1911	4,176	19,807
Arsikere	1909	6,803	2,159
	1910	3,850	2,459
	1911	6,099	1,792
Konehalli	1909	2,938	374
	1910	5,302	562
	1911	3,050	13
Tiptur	1909	4,915	1,648
	1910	3,970	1,087
	1911	8,146	5,351
Karadi to Gubbi	1909	900	71,349
	1910	1,284	25,497
	1911	1,663	33,609
Tumkur	1909	4,463	14,516
	1910	2,254	5,576
	1911	4,116	1,428
Hirehalli to Yesavantapur	1909	5,651	17,373
	1910	26,034	20,160
	1911	18,715	15,376
Kengeri to Chennapatna	1909	11,114	105,264
	1910	2,165	96,473
	1911	2,822	75,896
Settihalli to Yeliyur	1909	1,932	565
	1910	2,594	2,548
	1911	3,614	3,221
French Rocks to Paschimavahini	1909	1,825	25,588
	1910	2,747	33,453
	1911	2,500	44,981
Mysore and Mysore Pettah	1909	7,741	126,543
	1910	29,935	142,755
	1911	31,259	202,888
Kadakola to Nanjangud	1909	498	20,411
	1910	156	48,574
	1911	188	60,371
Dodkurgod to Yelahanka	1909	10,111	20,043
	1910	2,902	53,336
	1911	8,562	83,602
Pachur to Kamasamudram	1909	5,930	193,230
	1910	3,102	166,230
	1911	32,219	128,328
Bowringpet	1909	24,618	2,175
	1910	29,332	2,989
	1911	28,317	9,247
Nine Reefs to Marikuppam	1909	1,199,819	11,672
	1910	1,037,038	4,126
	1911	909,614	9,323
Tyakal to Krishnarajapuram	1909	3,670	297,651
	1910	44,065	356,052
	1911	7,763	282,701
Bangalore East, Cantonment and Market offices	1909	157,378	2,614
	1910	108,092	5,635
	1911	109,631	6,737
Bangalore City and Branch offices	1909	505,799	27,714
	1910	499,828	22,930
	1911	404,504	30,954
Total	1909	2,015,170	1,152,322
	1910	1,850,097	1,208,228
	1911	1,719,931	1,316,372

Other Commodities.

Stations		Inwards	Outwards
Devargudda to Harihar	1909	151,329	40,810
	1910	221,818	33,193
	1911	192,839	66,068
Davangere	1909	74,478	23,830
	1910	58,500	45,340
	1911	43,801	132,381
Tolhunse to Chikjajur	1909	7,525	49,821
	1910	38,829	3,735
	1911	78,860	42,024
Holalkere	1909	9,875	3,992
	1910	13,444	5,532
	1911	10,438	6,604
Ramgiri to Ajjampur	1909	17,886	15,592
	1910	11,439	3,696
	1911	14,922	18,887
Birur	1909	45,913	9,566
	1910	46,452	10,369
	1911	84,526	11,944
Sivapur to Tarikere	1909	12,652	26,496
	1910	14,210	11,701
	1911	12,061	11,685
Maserhalli to Bidare	1909	5,131	51,729
	1910	4,799	7,006
	1911	5,286	3,996
Shimoga (including out agencies of Sagar and Tirthahalli	1909	64,877	85,663
	1910	67,803	18,120
	1911	63,746	25,814
Kadur to Banavar (including Chikmagalur out agencies	1909	38,481	28,626
	1910	39,403	34,239
	1911	40,325	43,891
Arsikere	1909	131,083	83,182
	1910	246,007	117,855
	1911	203,030	69,771
Konehalli	1909	3,670	9,751
	1910	3,136	10,488
	1911	3,088	22,873
Tiptur	1909	45,004	15,959
	1910	22,684	17,640
	1911	16,184	5,426
Karadi to Gubbi	1909	17,702	28,669
	1910	18,779	48,335
	1911	17,695	59,784
Tumkur	1909	24,190	23,519
	1910	32,146	34,799
	1911	35,210	51,640
Hirehalli to Yesavantapur	1909	141,611	41,576
	1910	101,580	20,610
	1911	96,683	47,605
Kengeri to Chennapatna	1909	67,009	46,104
	1910	20,461	14,206
	1911	17,576	30,287
Settihalli to Yeliyur	1909	17,860	103,691
	1910	32,801	121,640
	1911	37,600	140,937
French Rocks to Paschimavahini	1909	56,411	81,661
	1910	27,335	37,532
	1911	54,439	32,073
Mysore and Mysore Pettah	1909	185,640	46,601
	1910	156,578	51,408
	1911	188,268	97,712
Kadakola to Nanjangud	1909	11,217	13,660
	1910	14,038	5,946
	1911	12,380	7,517
Dodkurgod to Yelahanka	1909	52,886	152,294
	1910	32,479	72,817
	1911	34,918	133,349
Pachur to Kamasamudram	1909	43,704	28,406
	1910	13,173	41,933
	1911	13,005	26,499
Bowringpet	1909	102,031	132,879
	1910	274,686	97,880
	1911	114,048	147,980
Nine Reefs to Marikuppam	1909	1,490,433	93,773
	1910	470,149	38,101
	1911	569,293	32,412
Tyakal to Krishnarajapuram	1909	42,891	97,402
	1910	34,932	108,155
	1911	46,722	268,795
Bangalore East, Cantonment and Market offices	1909	548,201	179,566
	1910	554,056	141,525
	1911	480,830	193,090
Bangalore City and Branch offices	1909	938,997	641,931
	1910	958,201	526,421
	1911	1,099,630	614,821
Total	1909	4,348,687	2,156,529
	1910	3,529,918	1,680,222
	1911	3,587,395	2,345,865

APPENDIX D.

TABLE I.

Toll-gate Statement of Bisle Ghat.

Years	Loaded carts		Empty carts		Cattle load		Cattle		Horse load		Horses	
	D.	U.	D.	U.	D.	U.	D.	U.	D.	U.	D.	U.
1909-10.												
November	7	...	...	22	6	...	1,047	2	1	...	1	...
December	69	43	6	34	8	...	730	241	22	6	2	1
January	66	47	3	31	...	44	...	...	...	...	...	...
February	87	58	...	39	...	...	...	6	1	1	...	...
March	40	36	...	25	...	...	28	...	...	1	...	...
April	40	14	2	16	...	...	...	...	...	...	...	...
May	19	10	...	...	...	...	...	...	...	...	...	...
Total ...	328	208	11	167	14	44	1,805	249	24	8	3	1
1910-11.												
November	28	6	4	18	68	40	3,363	378	8	8	1	1
December	21	17	...	20	...	...	...	14	10	2	...	...
January	79	81	...	61	...	...	...	...	...	...	...	...
February	71	31	...	39	...	...	...	...	...	...	...	...
March	25	26	...	16	...	...	2	...	...	...	...	...
April	49	24	...	41	...	...	...	...	...	...	...	...
May	32	4	4	...	...	...	...	...	...	...	...	...
Total ...	305	189	8	195	68	40	3,365	392	18	10	1	1
1911-12.												
November	52	4	...	7	88	19	4,747	261	...	...	4	...
December	6	28	22	17	...	...	...	...	...	...	...	...
January	106	47	2	97	...	...	12	1	...	...	...	...
February	83	46	12	120	...	...	17	...	...	...	...	...
March	54	5	32	9	...	...	...	...	...	...	...	...
April	11	1	1	8	...	...	...	...	...	...	...	...
May	5	...	...	4	...	...	...	...	...	...	...	...
Total ...	317	131	69	262	88	19	4,776	262	...	...	4	...
1912-13.												
November	69	14	9	25	44	18	9,006	1,047	17	2	4	...
December	19	34	8	55	...	8	2	390	1	1	...	...
Up to January 3rd 1913 ...	3	...	...	9	Incomplete.							

D means down the Ghat.

U means up the Ghat.

TABLE II.

Toll-gate Statement of Agumbi Ghat for 1908-09.

Month	Total number of empty carts	Total number of loaded carts	Up the Ghat — Loaded carts														
			Salt	Oil	Oil seeds	Cocoanuts	Fish	Tiles	Passengers	Rice	Chillies	Tobacco	Manure	Mixed	Cattle	Sheep
1908.																
January	607	989	440	40	...	6	66	22	66	....	...	...	316	26	45	2
February	405	1,543	643	54	22	18	32	148	28	...	5	...	525	...	106	...
March	238	1,180	410	16	24	...	50	235	45	...	...	...	339	45	95	...
April	169	710	230	36	27	6	43	186	13	...	...	6	105	23	38	...
May	103	515	155	110	10	15	17	80	43	...	...	3	29	...	23	...
June	16	119	...	28	5	7	4	5	29	2	...	...	...	...	1	...
July	7	13	...	...	...	1	...	...	10	...	...	...	...	...	5	...
August	2	108	...	3	102	1	...	...	2	...	...	...	...	...	10	...
September	4	97	...	13	31	17	7	...	9	...	...	...	...	...	14	...
October	3	190	...	11	17	31	68	...	7	...	...	...	...	...	...	...
November	5	341	25	22	10	23	50	...	35	16	...	...	...	13	...	...
December	30	882	178	54	11	11	110	45	48	47	...	...	175	...	2	...
Total ...	1,589	6,687	2,081	387	259	136	447	721	335	65	5	9	1,489	107	339	2

Several unimportant items have been omitted from these statements and consequently, the total given for loaded carts will not tally with the sum of those under the various heads.

TABLE II—*contd.*

Toll-gate Statement of Agumbi Ghat for 1908-09.

Month	Total number of empty carts	Total number of loaded carts	Up the Ghat — Loaded carts														
			Salt	Oil	Oil seeds	Cocoanuts	Fish	Tiles	Passengers	Rice	Chillies	Tobacco	Manure	Mixed	Cattle	Sheep
1909.																
January	56	957	268	16	74	9	40	130	...	29	...	...	359	27	74	...
February	65	867	177	30	16	...	39	178	43	47	...	...	220	92	21	...
March	96	761	100	56	25	7	36	250	16	91	...	...	69	105	47	...
April	12	830	146	42	48	5	...	266	153	76	...	...	3	84	52	4
May	19	372	89	8	23	7	16	98	36	47	...	2	8	45	64	...
June	2	125	44	8	3	6	5	...	33	7	...	4	...	10	6	...
Total ...	250	3,912	824	160	189	34	136	922	281	297	...	6	659	363	264	4

Several unimportant items have been omitted from these statements and consequently, the total given for loaded carts will not tally with the sum of those under the various heads.

TABLE II—*contd.*

Toll-gate Statement of Agumbi Ghat for 1908-09.

Month	Total number of empty carts	Total number of loaded carts	Down the Ghat — Loaded carts												
			Coffee	Paddy	Jaggery	Ragi	Blankets	Passengers	Rice	Chillies	Sandal	Mixed	Cattle	Sheep
1908.														
January	12	1,630	567	922	15	...	...	19	7	16	64	6	306	163
February	8	1,835	530	1,151	13	...	...	29	...	1	99	10	310	301
March	9	1,335	355	792	91	1	4	34	...	...	46	12	333	122
April	40	862	85	502	141	55	...	42	...	8	...	21	453	322
May	114	618	19	162	187	117	...	72	...	...	...	45	695	...
June	30	106	...	4	34	30	2	15	...	...	...	40	430	45
July	4	5	...	2	...	1	...	1	...	...	...	...	24	...
August	52	17	...	...	7	3	...	7	...	...	...	...	35	...
September	23	50	...	7	...	1	...	13	...	...	9	18	410	173
October	86	53	...	...	...	30	...	10	...	...	...	17	188	270
November	130	104	...	11	...	...	...	52	...	5	...	33	311	481
December	246	383	161	81	17	...	...	54	...	42	3	30	341	215
Total ...	754	6,998	1,717	3,634	505	238	6	348	7	72	221	232	3,836	2,092

Several unimportant items have been omitted from these statements and consequently, the total given for loaded carts will not tally with the sum of those under the various heads.

TABLE II—*concld.*

Toll-gate Statement of Agumbi Ghat for 1908-09.

Month	Total number of empty carts	Total number of loaded carts	Down the Ghat — Loaded carts												
			Coffee	Paddy	Jaggery	Ragi	Blankets	Passengers	Piece goods	Chillies	Sandal	Mixed	Cattle	Sheep
1909.														
January	81	1,330	486	635	34	...	...	23	...	43	70	35	294	30
February	138	886	310	461	30	...	...	34	...	44	3	11	138	...
March	255	720	96	93	156	...	5	162	7	18	117	63	163	239
April	393	472	11	151	57	3	...	81	...	11	78	65	232	106
May	347	294	...	103	16	22	8	23	2	15	...	76	477	131
June	20	118	...	8	25	29	...	18	...	...	...	37	335	...
Total ...	1,234	3,820	903	1,451	318	54	13	341	9	131	268	287	1,639	506

Several unimportant items have been omitted from these statements and consequently, the total given for loaded carts will not tally with the sum of those under the various heads.

TABLE III.

Toll-gate Statement of Marnhalli Ghat.

Year	Coffee	Paddy		Provision		Tiles	Manure	Salt	Jaggery		Tobacco	Copper	Lime	Sandal	Soap-nut	Empty carts		Cattle		Loaded carts	
	D.	D.	U.	D.	U.	U.	U.	U.	U.	D.	U.	U.	U.	D.	D.	D.	U.	D.	U.	D.	U.
1907-08 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	64	1,397	4,545	99	4,150	1,872
1908-09 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	58	227	3,772	3	1,915	1,402
1909-10 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	61	354	1,291	5	1,408	864
1910-11 ...	1,102	1,531	73	177	13	457	381	651	31	35	48	132	46	29	47	19	1,124	1,299	2,054	3,089	1,922
1911-12 ...	1,428	848	...	443	...	272	601	323	8	...	8	...	37	76	67	8	873	720	225	...	...

Several unimportant items have been omitted from these statements and consequently, the total given will not tally with the sum of those given under various heads.

D means down the Ghat.

U means up the Ghat.

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